

The Iron Age

A Review of the Hardware and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 10 Warren Street, New York.

Vol. XVIII: No. 7.

New York, Thursday, August 17, 1876.

\$4.50 a Year, Including Postage.
Single Copies, Ten Cents.

End View of the Exhibit of The Hart, Bliven & Mead Mfg. Co., at the Centennial.

Our illustration this week shows an end view of the Hart, Bliven & Mead Mfg. Co.'s exhibit of hardware in the Main Building (P. 70), near South avenue, Centennial International Exhibition. In our issue of July 6th, under the title of "Hardware at the Centennial," we described in detail their magnificent display of American hardware. The accompanying picture shows the pyramid shaped sample boards of Connell's gong bells, which are placed upon three wings, set on a turn-table which revolves by means of clock work. A limited side view, exposing a portion of the cases devoted to builders' hardware, is also seen, and the elegant finish which is completed by the handsome nickel-plated railing extending all round the exhibit, can be fairly estimated by the view presented in the picture. On the carpeted platform underneath the case they show samples of shovels and tongs, pokers, steel yards, barn door hangers and rollers, plate hinges, nut cracks, iron bench screws, grindstone fixtures, shovel and tongs stands, and irons, fire-dogs in brass and iron, &c. Three cases measuring about 34 feet by 4 feet 10 inches, and containing 38 sample boards completely covered with specimens of hardware manufactured by the company, together with the addition of the pyramid shaped exhibit of Connell's bells, goods attached to the cases and tastefully displayed on the platform underneath, complete the display of articles manufactured by this company. The cases are surmounted with handsome signs carved in solid walnut, the letters cut in panels of French walnut are gilded; between the center and end signs are placed two urns, one lettered B. & M., 1888, date of the foundation of the old hardware house of Bliven & Mead, in New York; the other, J. T. H., 1888, the date of commencement of manufacturing by Mr. J. T. Hart, in Connecticut. Connected with this exhibit, and in style precisely corresponding, is the display of the Bradford Lock Works, for which the Hart, Bliven & Mead Mfg. Co., are agents. They show their goods in two cases occupying 13 feet by 4 feet 10 inches. Between these two exhibits the office of the first named company is located, the whole being in charge of Mr. Charles J. Bliven, general manager of the Hart, Bliven & Mead Mfg. Co. For a full description of this elegantly arranged exhibit, we refer our readers to our issue of July 6th.

Wheeler's Process for the Utilization of Bessemer and Other Kinds of Scrap Steel.

A very serious obstacle to the profitable use of the different grades of steel scrap has been the necessity heretofore existing for remelting or reconversion, the processes being so expensive as to render the saving over the cost of new material very slight, and hardly to be considered an object by manufacturers.

Bessemer steel, for years after its introduction into general use, presented such difficulties in the way of remanufacture that the scrap was considered an absolute waste—which, taking into account the immense amount of this grade of steel used on railroads alone in the shape of rails, tires, etc., was a source of loss of such magnitude as to induce many costly experiments with a view to obviating it. Although there have been invented numerous processes for the purpose, which undoubtedly economize in the minor points to a considerable extent, yet, as they involve the objectionable and expensive feature of remelting, the percentage of saving must be deemed as comparatively small—this being the case more particularly in the lower grades, but applying more or less to all.

Judging from a large variety of specimens made by a series of processes (each, however, involving the same fundamental principle), invented by Elbridge Wheeler, Esq., of Philadelphia, Pa., the problem would appear to have been successfully solved, and in a manner so simple as to suggest very forcibly a comparison with the anecdote of Columbus' egg, and the whole secret may be contained in a nut shell, or—to carry out the simile—an egg shell. The process consists in simply raising the scrap steel to a welding heat in a crucible of any desired shape, which, while entirely excluding the air and preventing decarbonization and oxidation, is but slightly more refractory than the steel itself, and forms a component part of the mass, and will admit of being rolled or hammered with the latter into any desired shape—still retaining its relative proportion in the bar, and effectually protecting it while re-heating even to a welding heat, which may be repeated as often as desired without the slightest deterioration in quality. This last feature greatly enhances the value of the invention, as in all manipulations of the material subsequent to its manufacture it may be treated precisely like iron, welding without the use of flux as readily as the latter either to itself or to wrought iron.

danger of burning, as the iron casing, being more refractory, retains its shape, and is at the proper heat for working in the rolls, which effectually welds the mass together, forming an iron-coated steel bar, perfectly homogeneous as to the steel, while the iron having absorbed a small portion of the carbon of the latter, is improved in quality to a considerable extent, having greatly increased tensile strength and less liability to fracture in bending.

Independently of the primary consideration—the small cost of production—there are many other advantageous features claimed for this iron-coated steel, among which may be mentioned the following as the most important:

1. While possessing the immense tensile strength of the best qualities of steel (according to a recent test, 120,000 lbs. per square inch), its resistance to fracture from transverse strain is very materially increased, as the iron coating,

from its superior flexibility, prevents the separation of the particles on the surface of the steel at the outside of the bend, the point at which the rupture would necessarily begin. This may be readily demonstrated by taking two pieces of steel—one of the iron-coated and the other ordinary cast steel—of convenient size for bending readily by hand. After being bent double, the latter will almost invariably break upon straightening, while the former may be bent back and forth several times without showing any signs of fracture. The great importance of this feature is obvious, as it overcomes one of the objections to the use of steel for purposes such as bridge work, &c., for which its tensile strength and rigidity would render it particularly well adapted, were it not

little less important, both by overcoming objections to the use of steel which have heretofore rendered it unprofitable, as well as by extending its field of usefulness by its application to purposes heretofore considered impracticable.

Undoubtedly the most important of these modifications is the application to the manufacture of rails for both steam and street railroads. The T rails are made with a head of the iron-coated steel, upon the top or tread of which the iron is made very thin, gradually increasing in thickness toward the shank, where it forms about one-half the stock, and terminating in the base, which is composed wholly of iron. For this form of rail it is claimed that, while having the hardness of steel for wear on the

bolts and stays, &c., is made with a steel center, occupying about one-third of the bulk, as being the most advantageous combination.

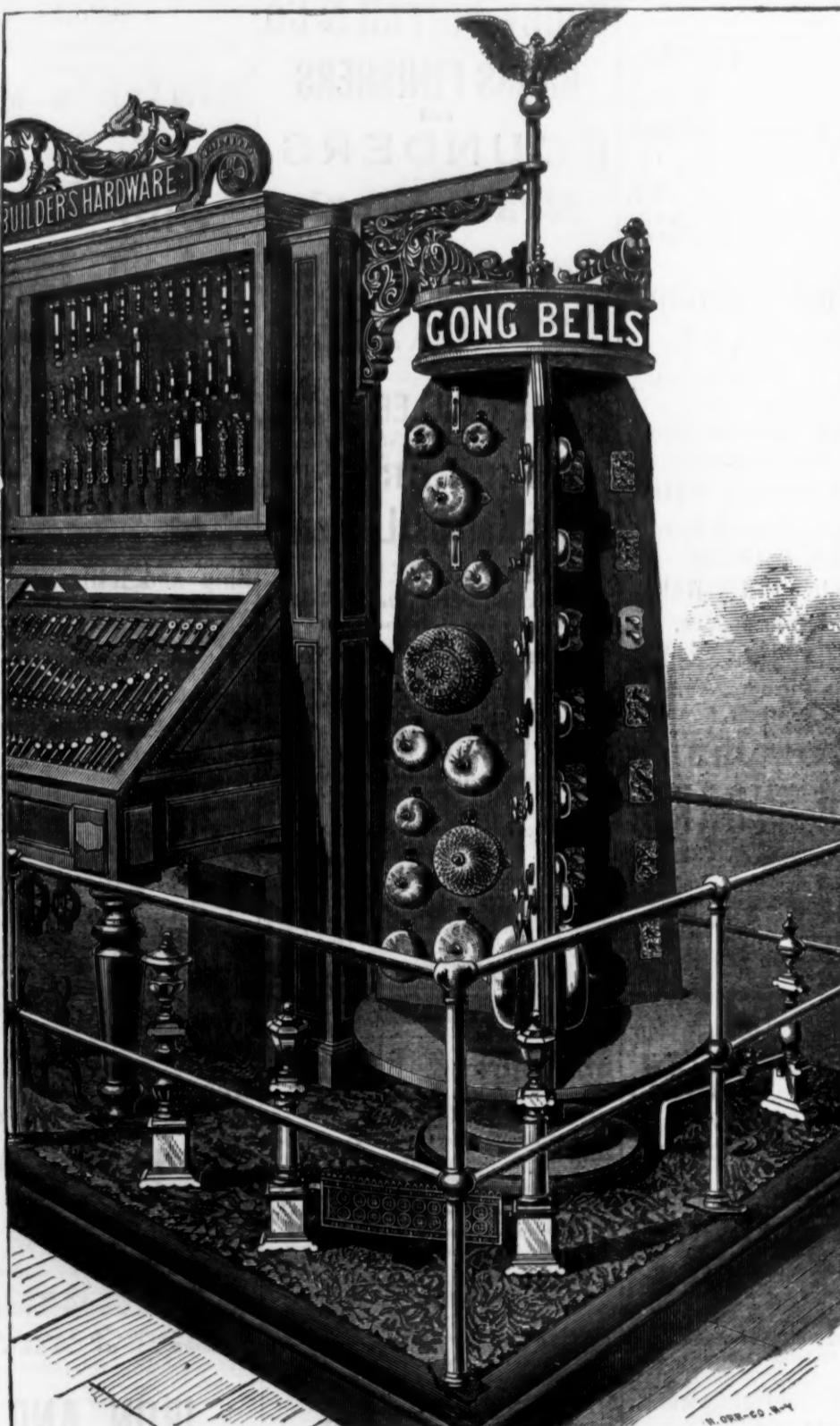
For car axles the bar is made with an iron center, of about one-half the whole diameter, surrounded by two-thirds of the remaining bulk of steel, and the whole encased in an iron coating of the proper thickness to allow of turning off on the journals, and exposing the steel for the wearing surface of the latter. It is claimed for this form of axle that by the alternation of the concentric iron and steel tubes surrounding the iron core, the tendency to crystallization, which usually occurs at the inner end of the wheel bearing, is effectually counteracted.

Another form of bar is adapted to uses for which iron is sufficiently strong, but is objectionable as not presenting a good wearing surface as steel. For this purpose the outer iron coating is made sufficiently thin to all work off in the finish, leaving the steel surface for wear, while the proportion occupied by the latter in the bar is just sufficient for this purpose, the center being of iron.

In using this form of bar for slide-bars for engines and similar purposes, the steel may be hardened without danger of breakage, and will thus present an excellent wearing surface of great durability. This feature is also claimed for car axles, and, if practicable, is of the utmost value, as overcoming in a great measure the tendency to heating of journals, which is one of the greatest difficulties experienced by train men, and is frequently the cause of accident or detention of trains. One of the most recent of these modifications, is the manufacture of hollow or tubular shafting or axles, for which many points of superiority over the solid bar are claimed. The bar or tube is composed of four rolled segments of the desired thickness, which are held together while being heated for welding, and passed through the rolls, without using the ball process usually employed. The thickness of the segments presents sufficient surface to render a butt weld perfectly safe, and it is claimed to be equal in strength to the lap weld. In making these tubes of steel the iron coating at the edges of the segments is the medium by which the welding is effected. This process, however, is not intended to apply solely to steel tubing, but is equally valuable in making iron tubes of unusual thickness, for hydraulic and similar purposes, which, when manufactured in the ordinary manner, involve great expense. Flanged iron columns are made in this manner, with the difference that instead of butt welds the joint is made on the flanges by passing through compound rolls, each pair of which welds the two opposite flanges.

If as appears to be the case, the inventions are what is claimed for them, they are of great value, and ought, ere long, to be generally adopted. The exhibit is made by the "American Tubular Iron and Steel" and "Pennsylvania Combined Iron and Steel Associations," and may be seen in space D. 4, col. 28, Machinery Hall.

The German iron trade has now got into such a state that the Prussian government has found it expedient to invite the Chambers of Commerce to furnish it with quarterly reports on the condition of the industry. One of these documents has just been issued by the Duisburgh Chamber of Commerce, in which they comment upon the iron trade in Westphalia. The report is now in the hands of the Prussian Minister of Commerce, and it will, no doubt, receive from that functionary all the attention which it deserves. We gather from the report that even though manufacturers have considerably curtailed their means of output, yet the difficulty of keeping employed their present number of workpeople does not diminish, but rather increases, and the entire out-turn can only be sold at prices which do not cover first cost. Following the example of their English competitors, iron-masters have blown out important furnaces, and the stopping of others is contemplated. The Duisburgh Chamber have taken the trouble to present to the government, in tabulated form, a comparison of prices as they now stand with those ruling in 1868. From this statement it appears that while the quotations for coal are still about 25 percent higher, those of puddled iron are about 10 percent lower than in the year referred to. The Chamber declares that the keeping on of mills and forges in Westphalia results in an actual loss to the proprietors, for while in favorable instances the prices obtained for their products cover the cash outlay in materials and wages, and a portion of the interest on invested capital, nothing is left for depreciation account, repairs, and the like. This sad depression in the trade of Germany is not confined to the major industry of iron making. The foundries are visibly affected by it. As compared with former years, the foundries of the Lower Rhine districts are now turning out less by 260,000 kilos. monthly; for whereas in former years they sold with ease an average monthly supply of about 350,000 kilos., only about 84,000 kilos. a month are now produced. The rolling and machine works, too, are reported to be in a correspondingly unfavorable condition as to the receipt of orders.



END VIEW OF THE EXHIBIT OF THE HART, BLIVEN & MEAD MFG. CO., AT THE CENTENNIAL.

Metals.

**ANSONIA
BRASS & COPPER CO.
19 and 21 Cliff Street,**

(Adjoining Office of Phelps, Dodge & Co.)

Sheet Brass, Plated Brass, Polished Brass Door Rail, Brass Wire, Hayden's Patent Brass Kettles, Brass Tubing, Lamp Burners, Sun Burners,
A large variety of Wood and Bronze Case Clocks.

MANUFACTORIES AT ANSONIA, CONN.
Phelps, Dodge & Co.,

IMPORTERS OF

TIN PLATE,

Sheet Iron, Copper, Pig Tin, Wire, Zinc, etc.

MANUFACTURES OF
COPPER and BRASS.
Cliff St., bet. John and Fulton,
NEW YORK.

T. B. CODDINGTON & CO.,
95 & 27 Cliff St., New York.
Importers of

TIN PLATES,
And METALS of all descriptions.

SCOVILL MFG. CO.,
419 & 421 Broome St., New York.

MANUFACTURES OF
SHEET AND ROLL BRASS,
BRASS AND COPPER WIRE,
GERMAN SILVER, BRASS BUTT HINGES,
KEROSENE BURNERS.
METAL BLANKS CUT TO ORDER.
CLOTH AND METAL BUTTONS, in every variety.

PHOTOGRAPHIC GOODS.
MANUFACTORIES
Waterbury, Conn.,
New Haven, Conn.,
New York City.

BINNS SMELTING WORKS
137 & 139 Frost Street,
P. O. Box 31. Williamsburg, N. Y.

Pig Lead, Tin, Solder, Britannia, Electrotypes, Stereotype and
ANTI-FRICTION METALS.

We make a specialty of the above grade of Metals, which are unequalled for durability and adapted to all weights and speeds. All that is required is a trial, which we guarantee will meet the expectation of the most particular, both in price and quality. Lead castings of every description made to order. *Dresses bought or melted to order.*

ANALYTICAL CHEMIST.

**Brass & Copper
SEAMLESS TUBING**
For Locomotive, Marine and Stationary Boilers.

MERCHANT & CO.,
525 Arch & 520 Cherry Sts., Philadelphia.

W. J. HAMMOND,
Dealer in all kinds of
BRASS, COPPER,
Cast Iron, Wrought Iron,
AND STEEL SCRAP. Cor. Eleventh St.
and Duquesne Way, Pittsburgh, Pa.

O. W. GRAVES
Metal Broker,
42 Cliff Street, N. Y.

TIN PLATE, COPPER, IRON WIRE,
And Metals of all Description.

SPENCER & UNDERHILL,
54 Beekman St., N. Y., Agents for
American Screw Co., Wood Screws, Hand
Raii Screws, Stove Bolts, &c.
O. Ames & Sons, Shovels, Spades and Scops.
A. Field & Son, Tacks, Brads &c.
G. F. Warner & Co., Metal Clamps and an
assortment of Builders' Hardware.

R. SELLEW & CO.
Dealers in METALS,
Tin Plate, Sheet Iron, Copper, &c.
SAINT LOUIS.

G. HAYES
71 EIGHTH AVE. N.Y.
PERFORATED METALS

Metals.**Waterbury Brass Co.**

CAPITAL, - - \$400,000.
JOHN SHERMAN, Agent,
No. 52 Beekman Street, NEW YORK.

Mills at WATERBURY, CONN.

Sheet, Rolled and Platers' Brass,

GERMAN SILVER,

Copper, Brass and German Silver Wire,

BRASS AND COPPER TUBING,

COPPER RIVETS & BURS,

BRASS KETTLES,

WASH BASINS,

Door Rail, Brass Tags & Step Plates.

PERCUSSION CAPS,

POWDER FLASKS,

Metallic Eyelets,

Shot Pouches,

Tape Measures, etc.

Manhattan Brass Co.,

Manufacturers of

Sheet Brass, Olmsted Patent Oilers,

Brass Wire, Prior Patent Oilers,

Copper Wire, Broughton Patent Oilers,

Copper Rivets, Brass, Tin & Zinc Oilers,

Brass Tubing, Brass Trimmings,

Spelter Tubing, Baby Carriage Hardware,

Satchel Frames, Stationers' Hardware,

Brass Blanks & Tubes

OF EVERY DESCRIPTION TO ORDER.

Agents for Hartford Eyelet Co.

Office, 88 Reade, cor. Church Sts., N. Y.

Works, 1st Ave. 27th to 28th Sts., N. Y.

J. H. WHITE, President. H. L. COX, Secretary.

J. H. CRANE, Treasurer.

Holmes, Booth & Haydens,

49 Chambers Street, N. Y.

ESTABLISHED 1853.

CAPITAL, - - \$400,000.

Manufacturers of all kinds of

Brass, Copper & German Silver,

ROLLED AND IN SHEETS.

BRASS & COPPER WIRE,

Tubing, Copper Rivets & Burs.

BRASS & IRON

JACK CHAIN, DOOR RAIL.

German Silver Spoons.

SILVER PLATED FORKS & SPOONS,

Kerosene Burners, &c.

Works at Waterbury, Conn.

BALTIMORE

COPPER WORKS.

POPE, COLE & CO.,

Are now Purchasing

Copper Ores

and smelting and refining at these works, where, with experienced workmen and unusual facilities, we are

turning out Ingots and Cakes of Copper of unequalled

purity and tenacity.

We are prepared to buy Ores, Matte, Regulus and other

metalliferous material, in any quantities.

Office, 57 South Gay St., Baltimore Md.

BENEDICT & BURNHAM

MFG. CO.,

78 Reade Street, New York.

Manufacturers of

KEROSENE BURNERS AND LAMP

TRIMMINGS, Etc.

We invite your attention to our extensive facilities for

manufacturing articles of utility, novelty, or embellishment, and assure you of our ability to meet the requirements of every branch of trade. The increasing demand upon us has made it necessary to extend our works, and we have recently added a large building to our plant, and our facilities for the production of Light Metallic Goods, in Copper, Brass or other Sheet Metals, are unsurpassed. The use of the most approved machinery and apparatus, the employment of expert and established reputation in this branch of manufacture, encourage us to solicit still more extended relations with those who require work of this class, and we take this method of calling your attention to our establishment.

BENEDICT & BURNHAM

MFG. CO.,

78 Reade Street, New York.

Manufacturers of

KEROSENE BURNERS,

Lamps and Lamp Trimmings

All Descriptions.

Drawer Pulls in all the Latest & Best Styles.

BRASS, GERMAN SILVER AND COPPER

In the Roll, Sheet, Wire and Tube.

BRASS BUTTS, RIVETS AND BURRS, Etc.

HOOKS SMELTING CO.

SUCCESSION TO

H. W. HOOK

METALLURGIST.

SMELTER & BRASS FOUNDER

MANUFACTURE OF

ALL KINDS OF

BRASS CASTINGS.

TYPE, STEREOGRAPHY

BABBIT & ANTI-FRICTION

METALS.

ALSO IMPORTER OF

BLOCK TIN, LEAD,

BROAD & HAMILTON'S PHIL.

Railroad and Machinists' Supplies.

W. S. ESTEY,

Manufactured and Dealer in

Wire Cloths, Wire Goods and Wire

WORK of every description.

Galvanized Twist Netting for Fencing Henneries,

&c. Foundry Riddles and Steel Casting Brushes.

59 Fulton Street, New York.

Anti Friction Metal

No. 1, 30c.; No. 2, 25c.; No. 3, 20c.

No. 4, 15c.; No. 5, 10c.; No. 6, 9c.

DIAMOND METAL, - - 30c.

E. A. Williams & Son,

107 Plymouth St., Jersey City, N. J.

Metals.

**The Plume & Atwood
Mfg. Company**

MANUFACTURERS OF

SHEET and ROLL BRASS and WIRE,

German Silver and Gilding Metal,

Copper Rivets and Burs,

Kerosene Burners,

Shoe Eyelets, Lamp Trimmings, &c.

80 Chambers Street, New York.

13 Federal Street, Boston.

ROLLING MILLS, Factories,

THOMASTON, CT. WATERBURY, CT.

JOHN DAVOL & SONS,

Agents for Brooklyn Brass and Copper Co.,

Dealers in

Ingot Copper, Spelter, Lead, Tin,

Antimony, Solder & Old Metals,

100 John Street, N. Y.

WAREHOUSE, 42 CLIFF STREET, NEW YORK.

WIRE ROOMS of all Grades; Round Iron, Ribbed quality, 2½ in. to 5 in., cut to any length. Openings and enclosures.

OPERATORS of the PATENT CONTINUOUS ROLLING MILLS, producing Iron and Steel WIRE in coils of 100 pounds without seam or WELD.

PATENT GALVANIZED TELEGRAPH WIRE, Market and Stone Wire, Annealed Fence and Grape Wire in long lengths; Coppered Pall-Ball Wire; Rope, Bridge, Bolt, Screw, Rivet, Buckle and Chain Wire. Wire for the manufacture of Card Clothing, Heddles, Bead and Piano-string Covering Wire, Tinned Spring Wire and Refined Wire to Pattern for particular purposes, from selected stamps of Norway Iron. Any grade of Wire furnished, Annealed, Bright, Polished, Coppered, Galvanized or Tin Plated. Wire furnished, Straightened and Cut to any length. Steel Crimpine Wire, Patent Linen finish. Unrivalled Steel Music Wire. Steel Wire for Springs, Needles and Drills. Market Steel Wire kept in stock, all sizes.

WAREHOUSE, 42 CLIFF STREET, NEW YORK.

NATIONAL WIRE and Lantern Works.

Warehouse, 45 Fulton Street, New York.

</

Philadelphia Fishing Tackle House



A. B. SHIPLEY & SON,
503 Commerce Street, PHILADELPHIA.
Manufacturers of
FISHING TACKLE, CHALK & FISHING
LINES, FISH HOOKS, LINES, LEAD-
ERS, RODS, FEELS, &c.

A specialty of celebrated Green Heart Wood and Fine
Brass and German Silver Rod Mountings. Our prize
Medal Lent and Glued and Green Heart Trout and Bass
Fly Rods are the best in the world.
Sole Agents for John James & Sons' Fish Hooks,
Needles, &c.
Price Lists to the Trade only on application.

TIN LINED IRON PIPE.

A pure BLOCK TIN PIPE within a wrought
iron tube, combining Purity, Strength, Durability
and Cheapness.

TATHAM & BROTHERS,
82 Beekman Street, N. Y.

Verona Tool Works.

METCALF, PAUL & CO.,
Pittsburgh, Pa.

Sledges, Hammers,
AND SMITHS' TOOLS,
AND THE STANDARD

Verona Solid Eye Picks.

All warranted the Best Solid Cast Steel.

LEWIS, DALZELL & CO.,
PITTSBURGH, PA.,
Manufacturers of



Patent DRIPPING AND BREAD
PANS;

Also Cold Rolled Sheet Iron, Bar, Sheet
and Tank Iron, and Nails.

EDWARD SWEENEY, Brass Founder,
Manufacturer of

GONG BELLS.

Steamboat and Locomotive Gongs kept on hand. A
special discount to the trade. Bell Hanging and Jobbing
done to order.

4 DUANE STREET, N. Y.

REDUCTION.
Manila Pails

REDUCED TO \$7.50 PER DOZ.

These goods we warrant not
to be affected by climate, or
water, hot or cold.

Are Durable, Light, Strong
and Tasteless, have no
hoops, and will not absorb
their contents. Orders from the
trade solicited.

For circulars and terms, address,

W. F. HYATT,
Manufacturers' Agent,
280 PEARL ST., - - NEW YORK.

THE
Gilbert & Bennett Mfg. Co.,
GEORGETOWN, CONN.,
MANUFACTURERS OF

Iron Wire, Curled Hair
AND GLUE.

Coal, Oat and Hair Sieves.
Hemp & Wire Gravy Sieves.
Brass and Iron Riddles.
Cheese Sieves.
Cats and Sand Screens.
Slave Caves Litter and Shovels.
Steel Scourers and Pokers.

Gilbert's Rival Ash Sieve.
UNION METALLIC CLOTHES LINE
WIRES.

The highest price paid for Cattle's Tails and Hog's Hair
WAREHOUSE,
273 Pearl Street, New York.

BEST IN THE WORLD.
Blatchley's Horizontal
ICE CREAM FREEZER

(Tingley's Patent)

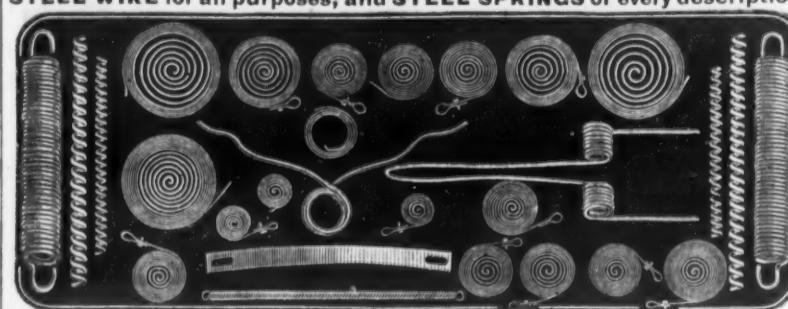
For Saloons, Hotels, Families or Ice Cream Manufacturers, in the economy and perfection of the work, is unsurpassed in quality. The closed head will save ice enough in one season to pay for the machine. The tank requires no water, filling up to freeze. Size, 3 to 40 quarts.

Visitors are cordially invited, when in town to the Big Exhibition, to come and see us, or send for descriptive circulars and price lists. We have a large collection made with the trade. The machines can also be seen at the Centennial Exhibition, Agricultural Hall, Cor. Alises 9 and N, Column letter O, No. 10.

C. G. BLATCHLEY, Manuf., 506 Commerce St., Phila.

CARY & MOEN,

Manufacturers of
STEEL WIRE for all purposes, and STEEL SPRINGS of every description.



Market Steel Wire, Crinoline Wire, tempered and covered.
Also Patent Tempered Steel Furniture Springs, constantly on hand.

234, 236 and 238 West 29th Street, NEW YORK.

The Faultless Fruit Can.

PATENTED.



The perfection of this article, in all of the essential points of a good
fruit preserver, has been thoroughly demonstrated by the immense number
of Patents taken out for it, and with largely increased facilities we
shall be able to meet the wants of the trade. As the cans are light
when made up, they must together, thus saving space greatly. The
opening is the full size of the top of the can, admitting of perfect cleaning
and fitting, making them much more durable.

When not in use, the cans make a safe receptacle for Tea, Coffee, Spices, etc., the close fitting cover making it air-tight.

Another important feature is the labeling device, whereby the con-
tent of the can, date, and method of preserving are easily shown.

We furnish complete trimmings for the FAULTLESS CAN,
including the body all ready for soldering, at the following very low prices, via:

\$8.50, 1 qt.; \$10.50, 1½ qts.; \$12.50, 2 qts. per gross.

Cans made up, \$9.75, 1 qt.; \$11.75, 1½ qts.; \$13.75, 2 qts. per gross.

We would caution dealers against an imitation of our can having a
"swell" or "dead" near the top to prevent the cans sticking together when
nested, as this feature is covered by our Patents.

The Trade only supplied.

Use good Sealing Wax for this, and all other cans, to secure good
results.

F. STURGES & CO., Sole Manufacturers,
72, 74 & 76 Lake Street, CHICAGO.

SCHIERLOH MFG. COMPANY,

Sole Manufacturers of



AWARDED NOV. 21, 1874.

Cherry Heat Welding Compound.

OFFICE, 24 Exchange Place, Jersey City, N. J.

This compound is put up and warranted genuine only in 1, 5, 10, 50 and 100 lb. packages, and can be obtained from the manufacturers direct, or from the following General Agents at manufacturers' prices, in large or small quantities:

WHITMORE, WOLFF, LANE & CO., Pittsburgh, Pa.

PARKHURST & WILKINSON, Chicago, Ill.

GEORGE D. HALL, St. Louis, Mo.

H. R. IVES & CO., Montreal, Prov. of Quebec.

It is also for sale in 1, 5 and 10 lb. packages by Hardware Dealers generally throughout the country.

PERFECT COMBUSTION BY
AN OXYGEN BLAST.

By this process oxygen is imparted to the blast simply by its passage, on its way to the place of combustion, through a chamber or vessel holding an oxygen compound, from which, by the agitation of the air thereon, oxygen is set free and thus imparted to the blast. The required volume of this blast is one-half less. The combustion becomes perfect, therefore, all the carbon in the fuel being converted into a high and concentrated heat, without smoke or gas, but that of carbonic acid, being formed. Beside a saving of fuel, obtainable in all cases by this blast, advantages arise from it varying according to the appliance of the heat. On Forge Fires it gives a clear and intense heat, free from all sulphurous gas, whereby a better and quicker heating is had and time saved. On fires under boilers for making steam, the saving in fuel is 25 per cent. and over, the working capacity can be increased in same ratio by reason of the intensified and accelerated combustion, which latter also overcomes the disadvantages connected with the use of fine dust and impure coal. Castings from a vessel in which the fire is sustained by this blast become of superior quality, uniformly soft to work and very tough, resembling wrought iron and steel; they forge hot and cold to some extent; the iron becomes strengthened and purified, being freed from carbon and sulphur. For blast furnaces this process becomes of vast importance—it saves fuel, increases the working capacity, perfects and reduces the cost of the metal, makes sulphurous and other impure ores fit for use. The serious drawbacks arising from imperfect combustion, caused mainly by otherwise uncontrollable atmospheric influences, are overcome. The work of a peeling furnace and that of decarbonizing the iron, both for wrought iron and steel purposes generally, is much simplified, shortened and perfected as to purity of product: the work of so many hours is reduced to as many minutes by this process. The process has the merit of being simple and easily applied, and with but very little expense, and this only for the needed chamber or vessel and its connection with the blast pipe; the vessel may be a wooden keg, barrel or larger cask or tank, properly lined, from two gallons for a single forge up to 500 gallons and over, according to the blast in use. The cost of the oxygen is conditioned by, and made subject to, its effect—it is but a small item compared to the gains from it. Although this process has been in practical use for over a year, the inventor felt reluctant to offer it to the public before having its utility and practicability fully established, beyond any and all contingencies, not from a theoretical standpoint, but from the testimony of manufacturers who have used the process this last year, and whose standing and reputation as manufacturers are of the highest order, and such as to entitle them to the consideration of others. For further information, and for small specimens of castings from this process, address

CHAS. HORNBOSTEL, 56 Broadway, Room 26, N. Y.

O. LINDEMANN & CO.,

Manufacturers of

JAPANNED AND PATENT BRIGHT METAL

Bird Cages.

Received the

FIRST MEDAL

at the

World's Exposition of Vienna,

1873.

Office and Salesroom,

No. 254 Pearl Street

Factory,

No. 252, 254 & 256 Pearl Street,

NEW YORK.

Importers of GERMAN TEA TRAYS in

four colors. Catalogues and Price Lists furnished to the Trade only.



Civil Engineering at the Centennial.

NO. II.

The Netherlands give greater prominence to civil engineering exhibits than any other country. Adjoining the principal avenue in the Main Building, a structure consisting of a central column with radial wings is erected, upon which are displayed drawings of some of the wonderful engineering achievements of this "land below the sea." Some of these drawings are very large, and attract attention from those not specially interested in this branch of science. In the space between the wings, and in proximity to the structure, are arranged models, relief plans, stands of photographs and albums.

The navigation between Rotterdam and the North Sea is shown by a large plan of the new channel and detailed drawings of the jetties. The construction is exemplified by models of fascines, mattresses and crib work, and a plan model of the southern jetty at the Hock van Holland. There are also plans and sections of the sea embankments of North Holland; a number of charts explaining the methods of protecting river banks, profiles and sections of dams across the Schelde Sloe and other streams; plans of the Flushing Harbor, and many other interesting features.

The collection of photographs is quite large, and is arranged upon revolving stands that each can be inspected. The wonderful pumping works constructed for the reclamation of the Harlemmer Meer is presented to notice by plans of the remarkable engine employed, drawings of the buildings, dykes, etc.

A very fine model of half of the large span of the arched truss bridge at Keulenberg, and a large drawing of the complete bridge, occupy very prominent positions. This bridge is 665 meters, or four-tenths of a mile long. The model has mirrors so placed that in looking into the bridge the whole span is seen. This span is 490 feet long. Plans and details of a swing bridge over the North Holland Canal, an iron crane bridge over the Ligne, and a steel swing bridge 95 feet long, are exhibited.

Of the canal system of Holland there is much of interest exhibited, including details and models of locks, plans, maps and sections of the canals from Amsterdam to the North Sea; drawings of the William III. Locks; section of breakwater; details of pneumatic foundations, pumping apparatus, construction of breakwaters, &c.

A surface model of the Zuider Zee, showing the complete topography and hydrography of North Holland, and portions of the provinces of Friesland and Gelderland, bears upon it the legend:

"Haarlem lake is drained,
And drained is the Y;
If peace is maintained,
Zuider Zee gets dry."

The truth of this prophecy is demonstrated by the model and accompanying maps, descriptions and reports. The reclamation of the Zuider Zee would be but a repetition on a grander scale of the wonderful work done on the Haarlem Lake, and, in fact, throughout the whole of North Holland.

The changes wrought by nature and by man are admirably illustrated by two maps, one showing North Holland in 1575, the other North Holland in 1875. In these 300 years the North Sea and the Zuider Zee have encroached considerably on the mainland; but this encroachment has been largely checked by the construction of dykes and breakwaters. The numerous lakes and ponds in the interior, which are prominently shown on the map of 1575, have given place on the map of 1875 to reclaimed farming land, snatched by pluck and perseverance from under the sea. The denudation and protection of the North Holland coast is illustrated by some interesting drawings.

Bostonians are startled to find in the Netherlands another "hub," and Chicagoans gaze in wonder at the new railroad center in the Netherlands, as exemplified by a map showing Vlissingen or Flushing as a remarkable commercial point, with railways diverging in all directions; leaping over seas and bays to Stockholm, Christiania, Copenhagen, Edinburgh, London, Liverpool, Dublin; or climbing over mountains to Vienna, Rome and Constantinople. The through line to Lisbon passing Brussels, Paris and Madrid would, in its directness, put to blush some of the American railway maps.

In connection with the special displays a large topographical map of the Netherlands is of great interest, for on it are shown all the railroads, canals, etc.; and prominent bridges and other engineering works have their locations marked with letters.

The harbor improvements at Harlingen are represented by two models of the breakwater piers, drawings and sections of the embankments, and a fine album of photographs illustrating the progress and difficulties of construction. The long bridge (nearly 4800 feet) over the Hollandeip is shown by a very fine painting and detailed drawings. And a handsome swinging double crane bridge on the Amsterdam and Rotterdam Railway is illustrated by an elaborated model and by drawings. There are also very pretty models of several automatic lock gates, a dredging boat, a Dutch swipe bridge, and others showing the construction of locks.

An interesting album of pen drawings of the water supply of 's Gravenhage describes the construction of buildings, details of pipes, etc. A peculiarity is a large tank supported upon ornamental masonry around the circumference, the bottom being tilted toward a stand pipe which rises in the center.

The Waterstaat engineers have a large album, giving in detail the features of the various districts, and two large portfolios filled with illustrations of noted bridges and other engineering structures.

Altogether, the Netherland's display of engineering works is wonderful, and when we remember that all these bridges, canal dykes, dykes, etc., are located in a kingdom covering little more area than the State of Maryland, and most of them in a district of one-fourth that size, we can imagine the difficulties over which the Hollanders have risen. To-day there are more people residing in the Netherlands than in the State of Pennsylvania, for whose convenience these bridges and canals are kept up, and for the protection of whose lives and properties the systems of dykes are maintained. There is much for us to learn from this display upon a subject too much neglected in this country. The reclamation of marshy and swampy ground, much of which is worthless, except for the propagation of frogs and malaria, could by judicious engineering constructions be made into valuable fertile land, and in many instances pay a very large profit upon the outlay.

New Rays of Calcium.—Mr. Lockyer, in a letter to M. Dumas, says: I have recently carried out a series of experiments upon calcium, employing at first a small battery and a small coil, and afterward a large battery and a large coil, and to avoid all doubt I photographed the results. I found that with the small coil I was able to obtain a photograph which only contained the ray in the blue, without any trace of the ray in the violet; and with the largest battery and the largest coil I obtained a photograph containing the rays of the violet without any trace of the ray in the blue, and by varying the surface of the battery I was able to get a spectrum resembling the absorption spectrum of calcium in the sun. These results agree so completely with those of the dissociation of a salt of calcium that I have asked myself the question if we have not here before us a dissociation of the calcium itself. Naturally we are unable to determine, for the present, whether we have a lower molecular group of calcium, or whether the calcium itself is a compound of two distinct subelements, if the expression may be used. It seems that we can only undertake to solve this question by photographing the rays of the calcium (H_2) in different stars. If we find that they present always the same relative breath and intensity there will be a strong presumption that we have met with a decomposition of calcium, or, in other terms, we shall have shown that a spectrum of rays is a spectrum due to different orders of molecular grouping. If, on the other hand, we find that these lines vary in breadth and in intensity, it will be difficult to explain this phenomenon except we admit that calcium, instead of being an element, is really composed of two substances.—*Comptes Rendus*.

The English File and Edge Tool Trades.—The Ironmonger says: The houses in these branches, whose business has been chiefly with the United States and Russia, have scarcely ever been worse off for orders than they are at the present time. There should have been during the past two months a large influx of orders, in anticipation of the next fall trade, and upon them men could be kept employed in the early summer months.</

Iron.
NEW YORK.

OGDEN & WALLACE,
Successors to GAM'L G. SMITH & CO.,
IRON & STEEL,
85, 87, 89 & 91 ELM ST., N. Y.
**COMMON AND REFINED
BAR IRON.**
SHEET AND PLATE IRON,
HOOP, BAND AND SCROLL IRON,
Rod and Horse Shoe Iron,
Angle and T Iron,
Swedes and Norway Iron, Norway Nail Rods.
Iron of all sizes and shapes made to order.

PIERSON & CO.,
Established 1790,
22 & 26 Broadway, 77 & 79 New St.
NEW YORK CITY
AGENTS

Burden's Best Iron
And Burden's H. B. & S. Iron.
All sizes and shapes in stock.

JACKSON & CHACE,
206 & 208 Franklin St., N. Y.
Importers and Dealers in
IRON and STEEL.
Agents for
JOHN A. GRISWOLD & CO'S
Bessemer Steel.
MACHINERY STEEL,
Cast Steel and
SPRING STEEL,
ANGLE and T IRON.
Special Irons for Bridge and
Architectural Work.

ABEEL BROTHERS,
Established 1785 by ABEEL & BYVANCE.
Iron Merchants,
190 South Street and 365 Water, N. Y.
ULSTER IRON
A full assortment of all sizes constantly on hand.
Refined Iron,
Horse-Shoe Iron,
Common Iron.
Band, Hoop and Scroll Iron.
Sheet Iron.
Norway Nail Rods.
Norway Shapes.
Cast, Spring and Tire Steel, etc.

A. R. WHITNEY. J. HENRY WHITNEY.

A. R. Whitney & Bro.,
Manufacturers of and Dealers in

IRON,
55 & 60 Hudson,
48, 50 & 52 Thomas, and
12, 14 & 16 Worth Sts.,
Our specialty is in

Manufacturing Iron
Used in the Construction of

Fire-Proof Buildings, Bridges, &c.

AGENCY OF
Abbott Iron Co. Boiler Plate & Tank Iron.
Albion Ware Works Boiler Flues.
Fencord Iron Works Shanting.
Passaic Rolling Mill Angles and Tees.
W. H. White's Bar Iron.
Passaic Rolling Mill Wrought Iron Beams
and Channel Iron.
Paxton Rolling Mills.

Books containing cuts of all iron now made, and Sam-
ple pieces at office. Please address 55 Hudson Street.

METAL ROOFING.

Hickcox Mfg. Co.,
280 Pearl Street, N. Y.

Manufacture the Patent C. RUGGATED IRON SHINGLES, making the most durable Roof in the market, not affected by cold or heat, or water, and will not damage the roofs to leach. Prices only \$6.00 per square, painted on both sides, packed ready for shipping.

BORDEN & LOVELL,

Commission Merchants

70 & 71 West St.,
Wm. Borden, L. N. Lovell, — New York.

Agents for the sale of

Fall River Iron Co.'s Nails,
Bands Hoops & Rods,
AND

Borden Mining Company's
Cumberland Coals.

WILLIAM H. WALLACE & CO.,
IRON MERCHANTS

Cor. Albany & Washington Sts.,
NEW YORK CITY.
W. H. WALLACE. W. BISHOP.

W. R. OSTRANDER,
Manufacturer of THE BEST IMPROVED
ALARM SPEAKING TUBE WHISTLE,

Speaking Tube, Elbows and Mouthpieces.
Made for new Trade List.
SPEAKING TUBES FITTED UP.

NEW YORK

Iron.
NEW YORK.

**G. HUERSTEL,
IRON and STEEL.**
Warehouse, 99 Market St., N. Y.
Branch Store at 213 E. 23d St., 5 doors east of 8d Ave.
IRON AND STEEL of ALL KINDS
Constantly on hand. Head, Sheet, Iron and Nails, Norway Iron, Cast Springs, Tool-Cards, and Bessemer Steel Tire.
Also, SPRINGS, AXLES AND BOLTS,
For Truck and Carriage Makers.

**A. B. Warner & Son,
IRON MERCHANTS,**
28 & 29 West and 52 Washington Sts.
BOILER PLATE,
Boiler Tubes, Angle, Tee & Girder Iron,
Boiler and Tank Rivets.
Sole Agents for the celebrated
"Eureka," Pennocks,
"Wawasset," Lukens,
Brands of Iron. Also all descriptions of Plate, Sheet, and Gasometer Iron. Special attention to Locomotive Iron. Fire Box Iron a specialty.

**Geo. A. Boynton,
BROKER IN IRON**
70 WALL ST., N.Y.

**POWERVILLE
ROLLING MILL,**
JOHN LEONARD,
450 & 451 West Street, NEW YORK.
Manufacturer of Best Quality
HORSE SHOE IRON,
And HOOPS. Also Best Quality
Cold Blast Charcoal Scrap Blooms,
And Dealer in OLD IRON.

Marshall Lefferts, Jr.,
90 Beckman St., New York,
MANUFACTURER OF
AMERICAN
Galvanized Sheet Iron,
AND AGENT FOR THE
Easton Sheet Iron Works, Easton Pa.
MANUFACTURER OF
Best Bloom, Charcoal & Refined Sheet Iron,
Galvanized Telegraph and Fence Wire
Galvanized and Tinned Roofing and Slatting
Nails.
Galvanized Hoop Iron of all widths.
Galvanized Staples.
Corrugated Iron for Roofing, plain or gal'd.
Galvanized Bars and Chains for Cemetery
Railing.
Tin Plates, Spelter, and other Metals.

**LEFFERT'S
ENAMEL WORKS,**
417 W. 24th St., N. Y.
All kinds of Plumbers' Materials, and every description
of Wrought and Cast Iron Work. Signs, door and
number plates enameled in any color and decorated in
any style. Illustrated Catalogues furnished on application.

DANIEL F. COONEY,
(Late of and Successor to Jas. H. Holdane & Co.)
88 Washington St., N. Y.
BOILER PLATES AND SHEET IRON,
LAP WELDED BOILER FLUES.
Boiler Rivets, Angle & T Iron, Cut Nails & Spikes.
Agency for Pottsville Iron Co., Merchant Iron Works,
Lebanon Rolling Mills, Pottsville Works, Laurel Iron
Works, the Bergen Rolling Mills, at Jersey City.

SOUTHERN HOLLOW WARE,
of every description.

JESUP & STERLING,
(Successors to Blackwell & Burr.)
Proprietors POCKET-IRON WORKS, Established 1824.
Agents HARRISBURGH NAIL WORKS.
7 & 9 Cliff Street, (near John), New York.
Thimble Skins and Iron, Burden's Horse Shoes,
Railroad Supplies, Merchant Iron, Grindstones.
Send for Centennial Catalogue.

W. MINOR SMITH,
BROKER IN

Pig Iron & Metals.
95 BEAVER STREET, NEW YORK.

GEORGE THORN,
Manufacturers of
Gasometer
and
Smoke Stack
RIVETS.

Bolts, Nuts, Lag Screws, Washers, &c.
151 Centre Street, N. Y.

P. W. GALLAUDET.
Banker and Note Broker,
Nos. 3 and 5 Wall Street,
NEW YORK.

HARDWARE, METAL, IRON, RUBBER, SHOE,
PAPER and PAPER-HANGINGS, LUMBER, COAL,
AND RAILROAD PAPER WANTED.
ADVANCES MADE ON BUSINESS PAPER AND
OTHER SECURITIES.

Iron.
NEW YORK.

**T. D. HAZARD,
BROKER IN
NEW & OLD RAILS,**
Foreign and Domestic
PIG IRON,
Wrought and Cast Scrap Iron
AND GENERAL METALS.
204 Pearl St., New York.

JAMES WILLIAMSON & CO.,
SCOTCH AND AMERICAN
PIG IRON,
No. 69 Wall St., New York.

U. O. CRANE,
BROKER IN
PIG IRON & METALS,
104 John St., New York.

John W. Quincy,
98 William Street, New York.
Anthracite & Charcoal Pig Irons,
CUT NAILS, COPPER,
BLOCK TIN, LEAD, SPETER, ANTIMONY, NICKEL, &c.

**BOONTON
CUT NAILS,
HOT PRESSED NUTS,**
Machine Forged Bolts,
Washers.
Fuller, Lord & Co.,
BOONTON IRON WORKS,
139 Greenwich Street, New York.

Swedish Iron.
A Variety of Brands, Including
IB HP 03
BARS suitable for Steel of all grades, Wire, Shovels,
Hoos, Scythes, Carriage Bolts, Nail Heads, Tacks, &c.
CHARCOAL FIG IRON for Bessemer and
Car Wheels.
MUCK BARS for Steel Smelting and Re-rolling.
SCRAP OR BAR ENDS.
Direct Agency for N. M. Höglund, of
Stockholm, represented in the United States by
NILS MITANDER,
69 William St., New York.
JERE ABBOTT, AGENTS: ALBERT POTTS,
Boston, Mass. Philadelphia, Pa.

Dan'l W. Richards & Co.,
Importers of and Dealers in
SCRAP IRON,
Pig Iron,
OLD METALS.
88 to 104 Mangin Street,
Foot of Stanton St., E. R., NEW YORK.

B. F. JUDSON,
Importer of and Dealer in
SCOTCH AND AMERICAN
Pig Iron,
Wrought & Cast Scrap Iron,
English and American
HORSE SHOE IRON, &c.,
457 & 459 Water St.,
and 235 South St., NEW YORK.

**GRATE
BAR**
"ECONOMY."
GEO. VANDERBILT, Sole Agent.
Especially adapted for burning Pea Coal, Pea and Dart,
and other fine material.
Office, Foot West 10th Street, New York.

P. W. PARROTT,
Manufacturer of the
"CLOVE"
**ANTHRACITE PIG
IRON.**

At Greenwood Iron Works,
ORANGE CO., N. Y.

Iron.
NEW YORK.

HARRISON & GILLOON
IRON AND METAL DEALERS,
558, 560, 562 WATER ST., and 802, 804, 806 CHERRY ST.,
NEW YORK,
have on hand, and offer for sale, the following:
Scotch and American Pig Iron, Wrought and Cast
and Machinery Scrap Iron, Car-Wheels, Axles and Heavy
Wrought Iron; also old Copper, Composition, Brass,
Lead, Pewter, Zinc, &c.

OXFORD IRON CO.,
Cut Nails and Spikes,
R. R. Spikes, Splice Bars and
Nuts and Bolts,
81, 83 & 85 Washington, near Rector St., N. Y.
JAMES S. SCRANTON, Agent.

BRADLEY, REIS & CO.,
NEW CASTLE, PA.,
Manufacturers of every description of
PLATE & SHEET IRON
Office, 22 Cliff Street, N. Y.

ESTABLISHED 1840.
PETER TIMMES' SON,
Manufacturer and Galvanizer of
Wrought, Ship, Boat, Dock & R. R.
SPIKES, RIVETS, NAILS, &c.
Nos. 281, 283 & 285 N. 6th St.,
Near junction of N. 3d St., Brooklyn, E. D.

**BURDEN'S
HORSE SHOES.**

"Burden Best"
Iron

Boiler Rivets.

Burden Iron Works, H. Burden & Sons

Troy, N. Y.
**Pottsville Spike, Bolt and
Nut Works.**

G. D. ROSEBERRY,
Pottsville, Pa.
Manufacturer of
RAILROAD SPIKES
MINING SPIKES,
Cold Pressed Nuts, Machine Bolts & Bolt Ends.

THOMAS J. POPE & BRO.
BORAX
Of Finest Qualities. METALS.

292 Pearl Street, near Beckman, N. Y.
Anthracite, Charcoal and Scotch Pig Irons, Ingot
Copper, Lead, Bismuth, Tin, Antimony, Aluminum,
Spelter, Nickel, &c., &c.

CUTLER & BROWN,
Shippers and Dealers in all grades of
MOULDING SAND.
FIRE SAND, FIRE CLAY & KAOLIN.
Also, manufacturers and dealers in
FOUNDRY FACINGS and SUPPLIES.

Office, 288 Cherry Street, N. Y.
Sand Banks at Albany; Retail Yard, 454 Cherry Street
Factory, 273 & 275 Cherry Street.
GEORGE W. CUTLER CLARENCE J. BROWN

RANCOCAS FACING MILLS.

J. W. PAXSON & CO., 514, 516, 518 Beach St., Phila., Proprietors.
Also Dealers in **FOUNDRY SUPPLIES,**

And all Grades of **MOULDING SAND.**

WHITEHEAD BROS.,
Office and Retail Yard, 517 WEST 15TH STREET, NEW YORK. Dealers in all grades of
NEW JERSEY, NORTH RIVER, CRESCENT AND ALBANY
MOULDING SANDS.
Also FIRE SAND, FIRE CLAY, KAOLIN and all kinds of
FOUNDRY FACINGS.

BAEDER, ADAMSON & CO..
Manufacturers of

SAND & EMERY PAPER & EMERY CLOTH.
(Also, in Rolls for machine work.)

Ground Emery, Corundum & Flint, Glue & Curled Hair, Hair Felt, & Felt-
ing for Covering Boilers, Pipes, &c., Cow Hide Whips.

STOKES.

PHILADELPHIA, 730 Market St.,
NEW YORK, 87 Beckman St.,

BOSTON, 143 Milk St.,
CHICAGO, 182 Lake St.

Iron.
PITTSBURGH.

PENNSYLVANIA IRON WORKS.
EVERSON, MACRUM & CO.,
Pittsburgh, Pa.,
Manufacturers of every description of
Bar, Sheet and Small Iron,
Make a specialty in
Fine and Common Sheet Iron.

W. P. TOWNSEND & CO.,
Manufacturers of
WIRE and
Black and Tinned Rivets
OF CHOICE CHARCOAL IRON.
Rivets any diameter up to 7-16 inch and ANY LENGTH
required.
19 & 21 Market St., PITTSBURGH, PA.

A. G. HATRY,
Manufacturers' Agent and Broker
Bar, Sheet, Tank, Boiler, Angle, T,
and Railroad Iron,
Nails & Spikes, Steel & R. R. Supplies.
PITTSBURGH, PA.

SHOENBERGER & CO.
Manufacturers of the
JUNIATA
Horse & Mule Shoes
NAILS AND SPIKES,
Horse Shoe Bar,
AND
SHEET IRON.
Goods warranted equal to any in the
Market. Send for Circulars in regard
to "PICKED NAILS."
Cor. 15th and ETNA STREETS,
PITTSBURGH, PA.

BOSTON ROLLING MILLS
Manufacture
Extra quality small Rods, from best selected Scrap Iron.
SWEDISH AND NORWAY SHAPES,
Nail and Wire Rods. Also,
Horse Shoe Iron, Hand Made
Horse Shoes & the Boston
Horse Shoe.
BOSTON ROLLING MILLS, W. R. ELLIS, Treas.
Office, 17 Battery-march St., Boston.

"PEMBROKE"
Round, Square & Flat Iron.
"FRANCONIA" Shafting & Bar Iron.
Extra quality when great strain or superior finish
is required. Also, Irons for ordinary work, like the
"ENGLISH REFINED."
WM. E. COFFIN & CO.,
No. 8 Oliver Street, Boston.

ASA SNYDER,
Importer of Scotch, and Furnace Agent for the cele-
brated Anthracite and Hot and Cold Blast Charcoal
PIC IRONS.
OFFICE AND YARD:
1008, 1010, 1012 and 1014 Cary Street,
Richmond, Va.
Orders for Scrap Iron filled.

OSCAR BARNETT,
Malleable & Gray Iron
FOUNDRIES.
NEWARK, N. J.

CUTLER & BROWN,
Shippers and Dealers in all grades of
MOULDING SAND.
FIRE SAND, FIRE CLAY

Iron.

PHILADELPHIA.

T. Horace Brown,
IRON, METALS & MINERALS,
205½ Walnut St., PHILADELPHIA.

AGENT FOR
Bechtelsville Iron Co.,
Wood Bros.' Charcoal Blooms & Billets
Virginia Bessemer Ore Co.

TIoga ROLLING MILL.
NOBLIT & BRO.,
Manufacturers of
HOOP, BAND, SCROLL AND GUIDE
IRON.
Germantown Junction, Phila.

H. L. GREGG & CO.,
Ship Brokers & Commission Merchants,
Importers of
Old Iron, Metals and Rags.
Freight engagements made to all parts of the world.
Marine insurance effected in reliable offices.
108 Walnut St., Phila.

THE CAMBRIA IRON WORKS,

Situated on the line of the Pennsylvania Rail Road, at the western base of the Alleghany Mountains, are the largest of their class in the United States, and are now prepared to make

1800 TONS PER WEEK,

Of Iron and Steel Railway Bars.

The Company possesses inexhaustible mines of Coal and Ore, of suitable varieties for the production of Iron and Steel Rails of

BEST QUALITY.

Their location, coupled with every known improvement in machinery and process of manufacture insures the best quality. But when quality is considered, at lowest market rates.

The long experience of the present Managers, of the Company, and the enviable reputation they have established for "CAMBRIA RAILS," are deemed a sufficient guarantee that purchasers can, at all times depend upon receiving rails unsurpassed for strength and wear by any others of American or foreign make. Any of the usual patterns of rail can be supplied on short notice, and new patterns of desirable weight or design will be made to order. Address,

CAMBRIA IRON COMPANY,
218 S. 4th St., PHILADELPHIA.
or at the works, JOHNSTOWN, PA.

Siemens' Regenerative GAS FURNACE.
RICHMOND & POTTS,
119 S. Fourth St., PHILADELPHIA, PA.

W. D. WOOD & CO.'S



PATENT

Planished Sheet Iron.

Patented March 14th, 1865 ; April 8th, 1873 ;
Sept. 9th, 1873 ; Oct. 6th, 1874 ; Jan. 11, 1876.

Guaranteed fully equal in all respects to the

IMPORTED RUSSIA IRON,

and at a much less price.

FOR SALE,

by all the principal

METAL DEALERS

In the Large cities throughout

THE UNITED STATES.

And at their Office,

III Water Street PITTSBURGH, PA.

THE PHOENIX IRON CO.,
410 Walnut Street, PHILADELPHIA.

Manufacturers of

CURVED, STRAIGHT AND HIPPED

Wrought Iron Roof Trusses, Beams, Girders & Joists,

and all kinds of Iron Framing used in the construction of Iron Proof Buildings.

DECK BEAMS, CHANNEL, ANGLE AND T BARS

curved to template, largely used in the construction of Iron Vessels.

PATENT WROUGHT IRON COLUMNS, WELDLESS EYE BARS,

For Top and Bottom Chords of Bridges.

Railroad Iron, Street Rails, Rail Joints and Wrought Iron Chairs.

REFINED BAR, SHAFTING, and every variety of SHAPE IRON made to Order.

Plans and Specifications furnished. Address,

SAMUEL J. REEVES, President.

V. G. HUNDLEY.
79 Reade Street, New York. Agent for



North Carolina Handle Co.,

(WILSON & SHOBER, Proprietors.)

Manufacturers of SPOKES, AXE, PICK, SLEDGE, HAMMER, HATCHET and other
gadgets. Full assortment always on hand.

Iron.

PHILADELPHIA.

J. & J. Rogers Iron Co.,
AUSABLE FORKS,

Essex Co., N. Y.

Manufacturers of

FINE CHARCOAL

Blooms & Bars

For Conversion into Cast Steel.

ALSO,

Horse Shoe, Round Square and

FLAT IRON,

Exclusively from Palmer Ore.

Agents:

Merrit Trimble, 21 Platt St., N. Y.

John Moorhead, Pittsburgh, Pa.



Wrought Iron Buildings, Wrought Iron Bridges, Corrugated Iron Roofs, Shutters, Doors, Flooring, &c.
Corrugated Sheets of all sizes manufactured by Moseley Iron Bridge and Roof Co., No. 5 Dey St., N. Y.

Bonnell, Botsford & Co.,

Iron, Nails & Spikes.

YOUNGSTOWN, OHIO.

OLD DOMINION

Iron and Nail Works Co.,

RICHMOND, VA.

R. E. BLANKENSHIP, Commercial Agent.

Manufacture

NAILS AND BAR IRON.

Bands, Scrolls, Horse Shoe Bars, Nut and

Rivet Iron, Spike Rods, Shafting, Bridge

Bolts, Ovals, Half Ovals, Half Rounds, &c.

Production of
American
Steel Mills.

Imports.	Tons.	Tons.
1872.	22,169	40,000
1873.	21,373	52,000
1874.	13,542	49,681
1875.		61,058

We think words would fail to make the table any more significant. They show that the decreased imports are not due to a decrease in consumption, but that the falling off in imports has been met by the productions of American steel manufacturers. This is, however, indirect evidence.

The absolute test of American steel side by side with foreign is the best evidence,

and fortunately we have this, and it shows conclusively the superiority of the former.

It was after tests of this kind that the Secretary of the Treasury issued his order, some two years ago, to use nothing but American steel on the public works.

The writer, in conversation with the contractor on the Bergen tunnel, was told of tests made in drilling the hard trap rock of the tunnel, which proved greater wearing qualities and at the same time greater ductility and toughness.

In the office of General Newton, in charge of the Hell Gate works, we received the same report.

One of the greatest triumphs of American tool steel is in its use for section knives for reapers and mowers.

Three years ago all of the steel used for this purpose was imported.

Now the largest manufacturers of this class of goods are using American steel with perfect success.

The writer has seen a letter, not written to a manufacturer of steel, but to a consumer, in which a manufacturer of section knives states that he is now using American steel exclusively, that it showed great uniformity, evenness of temper, and carried a stronger edge and made a better sickle knife than several foreign brands which were mentioned, and which are the best known.

This was said after testing the American and foreign steel in the same sections.

These examples might be given almost indefinitely, but it is sufficient to say that almost without exception the leading consumers of high grade steel are using American brands.

We believe that there is a future for American steel, and we base this belief not so much on the past as upon the character of our iron.

While so much is said about the use of Swedish iron in steel making, it is well known that even in high grade steel these are only used as mixtures, and skill in steel manufacture being equal, the country which has the best irons to mix with the Swedish will make the best steel.

With the fine, pure, charcoal irons of this country, at the price they can be offered in the future, we can have as base for mixture what no other country can approach.

To-day in our common steels, in which little or no Swedish iron is used, American steel is confessedly superior to all others.

And, under the conditions we have indicated above, this country must be the steel producing country of the world;

our supply of charcoal irons will force it, and capital invested in steel works must, as it is already

intimated it will be, invested in this country.

In view of the facts given above, the American steel exhibits at the Philadelphia Exposition become something more than a mere array of bars and sheets.

To ourselves they are an earnest of the future; to our visitors they mark a progress that must be surprising.

In his report of the Paris Exposition, Mr. Hewitt writes,

in regard to the iron and steel exhibits of this country: "The only proof of the existence of any manufacture of steel in the United States was contained in a case of very beautiful specimens contributed by Park Bros. & Co., of Pittsburgh, for which they received a silver medal."

SINGER, NIMICK & CO.,

of Pittsburgh, make a very fine display at T. 60,

Main Building, consisting of saw, tool, plow,

machinery, safe and boiler steel, and steel rail-

way axles and springs.

This firm make a specialty of saw steel, with which they have been particularly successful.

A hand saw made of their steel, shown at the Cincinnati

Exposition of last year, was pronounced equal

to the best French saws.

They have had the

American Steel at the Centennial.

The history of the manufacture of cast steel in the United States is a record of constant struggle, not only with the difficulties necessarily attending its manufacture, and the lack of skilled workmen, where skill was such an important factor in success, but also with a prejudice against American steel that in many cases has been without just grounds. In every struggle, though the result may have been doubtful for a while, complete success seems to have rewarded the persistent efforts of our manufacturers.

The prejudice, which was the most obstinate bar to success, is largely removed.

Consumers of steel who three years ago denied most

positively that they used, or could use, American

steel, and published that they used English steel exclusively, now do not hesitate to own that they

use American steel, and place their products on

exhibition with displays of the products of

American mills. It is to the energy and courage

of a few men, principally in Pittsburgh, that

this result is due. Works were built at a large

expense, costly experiments undertaken, skilled

labor brought here by offers of large wages,

and, after years of trial and the expenditure of

millions of dollars, our steel makers solved the

mystery, and made the fabrication of steel

in America an assured success. This is not

merely assertion, but facts prove it true.

There is no better evidence of the value of a thing

than its use, and when the use of foreign steel

grows less yearly, and the production and con-

sumption of American increases, it is good proof

that consumers regard the latter as at least

equal to the former, and if we consider the pre-

judice, we should be inclined to say a little

better. To show the relation imports and pro-

duction bear we give the following tables. The

figures of imports are from the United States

Navigation Reports. We are without figures

showing the number of tons import in 1875,

but the value is one-fifth less than in 1874:

The effect of this mill in keeping down prices

during the war was surprising, and the officers

of the United States government declared

that it saved the country many thousands

of dollars in the price of steel.

The homogeneous steel for boiler plates shown in the exhibit are worthy of more than a passing notice.

It is well known that the experience in this

country and Europe, especially in England, in the

use of steel in boilers and fire-boxes is totally

different. In Europe it is regarded, for the

most part, as uncertain and unreliable for these

purposes, while in this country the very best

results have followed its use. The reports re-

ceived by the American Master Mechanics' As-

sociation is largely in favor of steel, and for

locomotive and river boilers it is fast taking

the place of iron. The reason of the

different experience here and abroad is not

difficult to find. To make a boiler plate the

carbon must be reduced to a minimum, and the

tensile strength still be high. With our pure

charcoal pig irons this is possible, and in

Iron.

CLEVELAND.

Cleveland, Brown & Co.

IMPORTERS, MANUFACTURERS AND DEALERS IN

IRON AND STEEL,**HORSE SHOES, HORSE NAILS,****NORWAY NAIL RODS,****NAILS, SPIKES,****"Standard Taper" Axles & Wedges Iron,****WINDOW GLASS,**

Wrought Iron Pipe and Boiler Tubes.

Cantile, Rivets, Nuts, Washers, and Heavy

Hardware Generally.

25 27 29 & 31 Morwin Street,

CLEVELAND, OHIO.

The Iron-Masters' Laboratory.

Exclusively for the Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags & Coal for Practical Metallurgical Purposes.

No. 339 Walnut Street, Philadelphia.

J. BLUDGET BRITTON.

This Laboratory was established in 1866, at the instance of a number of practical iron-masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

CHARGES TO IRON WORKS.
 For determining the per cent. of Pure Iron in an ordinary Ore..... \$4.00
 For the per cent. of Pure Iron, Sulphur and Phosphorus in do..... 13.50
 For each additional constituent of usual occurrence..... 1.50
 For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.
 For determining the per cent. of Sulphur and Phosphorus in Iron or Steel..... 14.00
 For each additional constituent of usual occurrence..... 6.00
 For the per cent. of Carbonate of Lime, and Insoluble Silicious Matter in a Limestone..... 10.00
 For each additional constituent..... 2.00
 For the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal..... 12.50
 or determining the constituents of Slag, Slag Coke, or Ash of Coal the charge will correspond with those for the constituents of an ore.
 For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.
 Printed instructions for obtaining proper average samples for analysis furnished upon application.

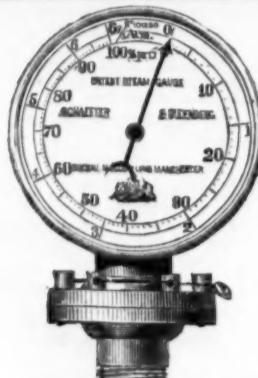
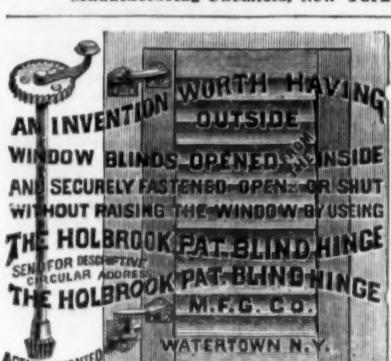
WALLACE & HUMPHREY,
Analytical Chemists,

113 Walnut St., PHILADELPHIA.

Special attention given to analysis of Iron and Steel.

GEORGE W. BRUCE.No. 1 Platt Street, New York.
Offers a full assortment of Nettlefold's superior Screws, Eyes, Hooks, &c., also many sizes of their Screws, which can be supplied very advantageously for foreign orders, though our duty equals the present American price.**BORAX.**

We beg to offer to the trade our own well known brand of strictly pure crystallized Borax, in barrels and cases, at greatly reduced prices. Apply for terms at CHAS. PFIZER & CO., Manufacturing Chemists, New York.

**SCHAFFER & BUDENBERG,**
MAGDEBURG, GERMANY.

Steam, Blast, Vacuum and Hydraulic Gauges, Engine Counters, Pyrometers, Buss Patent Governor, steam Releasing Valves, &c. Sole Depot,

W. HEUERMANN,
NEW YORK

Iron.

Iron.

THE MILWAUKEE IRON CO.

Manufactures and Offers For Sale

MERCHANT BAR IRON.

Flat Bars up to 6x2. Rounds and Squares up to 4 inch, Ovals, Half Ovals, Half Rounds, Box Iron Cylinder Bars, Plow Beam Iron, &c. Also, Hoop, Band, Horse Shoe and Shafting Iron of superior quality. A full assortment in store after February 1st.

PIC IRON.

Superior No. 1 Foundry Iron constantly on hand. Bessemer Iron and Special Grades of Foundry Iron made on orders.

RAILROAD IRON.

Thirty Patterns, from 30 to 65 lbs. per yard. Re-rolling done on short notice.

RAILROAD SPLICES.

Fish Plates to fit all rails used in the West. Track Bolts made from Iron of superior quality. A large stock on hand. New patterns made promptly.

CAR LINKS AND PINS.

All patterns kept in store or made to order. Link and Pin Iron in stock.

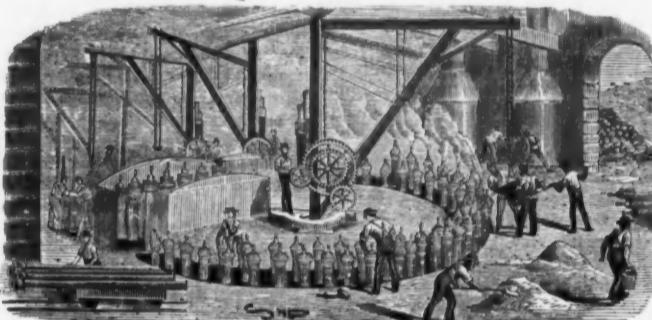
CAPACITY OF WORKS FOR 1876.

Merchant Bar Iron	20,000 tons.
Pig Iron	35,000 "
Railroad Iron	40,000 "
Railroad Splices and Couplings	5,000 "

Address all correspondence to

MILWAUKEE IRON CO., Milwaukee, Wis.**McNEALS & ARCHER,**

BURLINGTON, N. J.

Flange Pipes.

General Foundry Work.

CAST IRON PIPES

FOR WATER AND GAS.

JOHN H. REED & CO., IRON MERCHANTS,

And Agents for BAY STATE IRON CO.,

Manufacturers of and Dealers in

Homogeneous Boiler & Fire Box Plates, Plate, Sheet, Pig & Railroad Iron. Wrought Iron Girder, Channel & Deck Beams.

ANGLE and T IRON, BOILER and TANK RIVETS, Lap-Welded Iron Boiler Tubes, Wrought Iron Steam and Gas Pipe.

OFFICES, - - - - - 2 Pemberton Square, Boston, Mass.

IRON FOUNDRY.

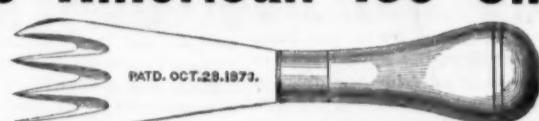
ESTABLISHED IN 1840.

SAMUEL J. CRESWELL, Jr.,

OFFICE: 812 Race St. WORKS: Twenty-Third & Cherry Sts.,

PHILADELPHIA.

Iron Fronts, Stair Girders, Lintels, Columns, etc

The American Ice Chisel

PAT'D. OCT. 29. 1873.

THE HARDWARE TRADE are hereby cautioned against an imitation of our American Ice Chisel, made of Malleable Iron Castings, which has made its appearance in the market. It is nickel plated and calculated to deceive. Our chisels are made of the best cast steel and warranted.

EDWARD J. HOLDEN & CO.,

P. O. Box 2167, Or No. 54 Beekman Street, NEW YORK.

H. S. MANNING & CO.,

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S

Manufacture of Patent Machine Relieved Nut, Hand, Blacksmith and Machine Screw Taps, Screw Plates, Tap Wrenches and Patent Relieved Pipe Taps and Pipe Reamers, also of Solid Bolt and Pipe Dies. Furnished either in V or U. S. Standard shape of threads.

111 Liberty Street,

NEW YORK.

Iron.

CLEVELAND ROLLING MILL CO.,

Manufacturers of

Bessemer Steel & Iron Rails & Fastenings,**SPRING STEEL AND WIRE of all kinds,****HORSE SHOES, TIRE, AXLES and other forgings.**

Boiler Plate, Galvanized & Black Sheet Iron, Corrugated Roofing & Siding of

Siemens-Martin, Bessemer Steel & Iron.

CLEVELAND, O.

Agents for the UNION STEEL SCREW CO.

**ATKINS BROTHERS,**

Proprietors of the

Pottsville Rolling Mills & Pioneer Furnaces

POTTSVILLE, PENNSYLVANIA.

Having introduced New and Improved Machinery into their Rolling Mills, and manufacturing all their Iron from the ore, and also doing all Machine Work and Repairs in their own shops, they are enabled to produce

T and STREET RAILROAD IRON,

Of all Patterns and of uniform quality, unsurpassed for strength and wear, and of any required length.

Address the Proprietors, Pottsville, Pa.

VERMONT SNATH CO.,

Springfield, Vermont.

Manufacturers of

PATENT SCYTHE SNATHS AND GRAIN CRADLES.

R. M. GREEN & CO., Agents, 89 Chambers St., N. Y.

JAMES C. HAND & CO.,
Commission Merchants,

PHILADELPHIA.

AGENTS FOR THE SALE OF

PIG IRON, Wm. Penn, Norristown and Reading Furnaces.

WM. JESSOP & SONS' Cast Steel, &c., &c.

READING NAIL AND IRON CO.'S (Crescent Brand) Nails, Brads and Spikes.

BARROW, SAVERY & CO.'S Tinned, Enamelled and Plain Hollow Ware, Medium and Carron Hollow Ware, Sad, Tailors' and Laundry Irons, Fire Dogs, Wagon Boxes, Savery's Patent Combined Enamelled Water Cooler and Refrigerator, &c., &c.

PENNSYLVANIA CORUNDUM CO.'S Corundum in Casks and Packages.

WASHINGTON MILLS EMERY CO.'S Best Turkish Emery in Casks and Packages.

FISHER & NORRIS' Patent American Anvils and Vises.

CAST BRASS BUTT HINGES,
Brass Rim & Mortise Locks, Ice House Hinges & Fastenings.

Manufactured and for sale by

W. & J. TIEBOUT,

MANUFACTURERS OF

Brass, Galvanized and Ship Chandlery Hardware.

THE SWIFT MILL.
ESTABLISHED 1845.

No. 16.

BUERK'S Watchman's Time DETECTOR.

Important for all Large Corporations and Manufacturing Concerns.

Capable of controlling with the utmost accuracy the motion of a watchman or patrolman as the same reaches different stations of his beat. The instrument is complete in itself, portable and as reliable as the ordinary watch clock. A small inexpensive stationary key is alone required at each station. The instrument will, in all cases, be warranted perfect and satisfactory.

CAUTION.—The public are notified that in my suit against Imbauer & Co., of New York, a decree was made in my favor, June 10, 1874.

Proceedings have been commenced against said Imbauer & Co., for selling clocks contrary to the order of the Court, and especially the clock with a series of springs in the cover, and marked "Patented Oct. 20th, 1874." All persons discovered using these infringing clocks will be dealt with according to law.

J. E. BUERK, Proprietor,

P. O. Box 979.

In sending for circular or ordering the above, please mention this paper.

W. & B. DOUGLAS,
MIDDLETOWN, CONN.

The Oldest and Most Extensive Manufacturers of

**PUMPS,
HYDRAULIC RAMS,
GARDEN ENGINES
Yard Hydrants, Street Washers.**

AND OTHER

Hydraulic Machines
IN THE
WORLD.

Awarded the GRAND MEDAL of PROGRESS at WORLDS' EXPOSITION, VIENNA, 1873, being the highest awards on Pumps, &c., also, highest medal at PARIS in 1867.

Descriptive Catalogues and Price Lists sent when requested.

BRANCH WAREHOUSES,

85 & 87 John Street, N. Y.

AND

197 Lake St., CHICAGO, III.

UNION MANUFACTURING COMPANY,

Manufacturers of all styles Plain and Ornamental Butts

LOOSE PIN REVERSIBLE,

Drilled and Wire Jointed.

Japanned, Figured Enamelled, Nickel Plated and Real Bronze Butts. A. & G. a full line of

IRON & BRASS PUMPS,

Clayton, Well, and Force Pumps, Yard, Drive Well, Garden Engine and Steam Boiler Pumps, Hydraulic Rams, etc., and all with the most modern improvements. Fine Castings a Specialty.

NEW BRITAIN, CONN.

Warehouses,

88 Chambers St., N. Y. 67 Kilby St., Boston. Pumping & Heating & Ventilating Co., 507 Commerce St., Phila. (Butts.)

Send for Illustrated Catalogue and Price List.

BUFFALO
Bellows Factory and
Planing Mill.

ESTABLISHED 1852.

JOSEPH CHURCHYARD,
Contractor, Builder
AND
Manufacturer,
CLINTON, cor. ADAMS STS.,
Buffalo, N. Y.
SASH, BLINDS DOORS,

Cisterns, Tanks, Stairs, Hand Rails, Newels, Mirror Frames, Mantels, Curtain Cornices, Book Cases, Veneered Doors, Mouldings, and complete interior and exterior finish for houses.

ROUGH AND PLANED LUMBER,
Flooring, Siding, Shingles, Lath and Fence Posts.

Blacksmiths' & Moulder's Bellows.

J. CLARK, WILSON & CO., Agents
586 Water St., N. Y.
Manufacturers of

NEWCOMB BROS., Standard Bellows.

GEO. M. SCOTT,
MANUFACTURER OF
BELLOWS,
JOHNSON ST., COR. 29th,
CHICAGO.
Established 1858.

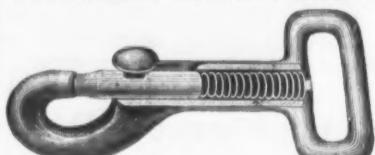
C. W. VAYO & CO.,
Manufacturers of
WHIPS & LASHES
OF EVERY DESCRIPTION.
Office & Salesrooms,
Cor. PINE & MILL STS.,
LOCKPORT, N. Y.



**IF YOU WANT THE BEST
AT
Reasonable Prices,
Buy the following Goods:**



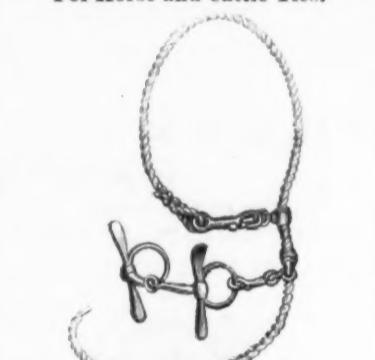
THE COVERT HARNESS SNAP.



Sectional View of the Snap.



THE COVERT SNAP AND THIMBLE.
For Horse and Cattle Ties.



THE COVERT ROPE HORSE TIE.
Made Up.



THE COVERT CATTLE TIE.
Made Up.



THE COVERT LEATHER HORSE TIE TRIMMING.



THE LEATHER HORSE TIE.
Made Up.



THE 1876 BREAST CHAIN.



COVERT'S METALLIC HOLD BACK.

Send for Illustrated Circular and Price List.
Address,
HOLD BACK & SNAP CO.,
TROY, N. Y.

New Patents.

We take the following abstract of new patents, recently issued, from the official record:

178,453.—*Fluting Iron*.—W. L. McCausland, Dallas, Texas.—June 6.

178,465.—*Valve for Direct Acting Engines*.—Edward Purvis, New York, N. Y.—June 6.

178,502.—*Saw Mandrel*.—Jas. T. Baggs, Bridgeport, Ohio.—June 13.

The saw can be held to run in a plane perpendicular with the mandrel, or readily changed to different angles therewith, by means of two adjustable collars, the inner collar being provided with a pin extending through a slot in the saw into a corresponding slot in the outer collar, and a graduated plate loosely attached to the outer end of the arbor, and adjustable, as desired, by set screws passing through it, and pressing against shoulders formed on the outer collar.

178,513.—*Water Chill for Puddling Furnace Throats*.—Thomas Davis and William Roberts, Sharon, Pa.—June 13.

178,604.—*Ducking for Balanced Piston Valves*.—David Dale, Millerstown, Pa.—June 13.

178,648.—*Valve for Steam Pumps*.—W. H. Laurie, Montreal, Canada.—June 13.

178,711.—*Hydraulic Elevator*.—Henry E. Bathrick, Somerville, Mass.—June 13.

178,822.—*Chill*.—Charles A. Wilson, Cincinnati, Ohio.—June 13.

Chill may be hinged on one side and dowelled on the other. Hardens external surface of pipe, but leaves inside of ends soft for threading or screw cutting.

SOLDERING IRON.

To Wm. H. Clark and Wm. J. Clark, Salem, Ohio.—June 20.—Dovetail projections on the jaws clasp recesses on the soldering iron. In tinner's soldering irons, the jointed sec-

tions A B, provided with one or more wedge shaped or dovetailed jaws, D E, in combination with the copper G, having therein gains F F', corresponding with said jaws.

BUCKET EAR.—REISSUED.

To John G. Kirchbaum, Youngstown, assignor to Barrett, Waters & Lewis, Cincinnati, Ohio.—Patent No. 89,666, dated May 4, 1869.—June 20.

1. A bail ear consisting of a single strip of material, the ends of which are bent at an angle

BUCKET EAR.

to the body of the ear to form two prongs, located one above the other, and the upper portion of the ear formed into a loop for the attachment of the bail.

2. A bail ear constructed with two prongs, located one above the other, and a loop, and formed of a single piece of material.

178,832.—*Combined Saw File and Set*.—Eben M. Boynton, Newburyport, Mass.—June 20.

178,833.—*Wrench*.—Walter Britton Elmore, Ill.—June 20.

178,838.—*Machine for Rolling Axles*.—Gilbert K. Dearborn, Somerville, Mass.—June 20.

The axle is inserted endwise between the rolls, which are closed down upon it to impart the desired shape and size.

178,855.—*Charcoal Kiln*.—Bart Kane, Cincinnati, Ohio.—June 20.

178,870.—*Reversible Valve for Steam Engines*.—Frank Murgatroyd, Cleveland, Ohio.—June 20.

178,872.—*Saw Filing Machine*.—William S. Newton, Norwich, Conn.—June 20.

A sliding gage arm is attached to the under side of the frame, parallel with the rotary file journal, to regulate the depth of the cut. The saw is fed by the usual switch shifter.

178,873.—*Nail Plate Feeder*.—J. Newell, Detroit, Mich.—June 20.

The invention comprises a magazine for receiving a pile of plates; a device for forcing the lowermost plate from the pile, dropping it upon the floor of the magazine; a feeding rod, operated by a screw shaft, for pushing the plate forward; an intermittently revolving sheath or plate holder, for receiving the plate and presenting it to the cutters (caused to rotate as the cross-head to which it is attached reciprocates) by the lugs upon its periphery entering spiral slots cut in a series of stationary disks; a mechanism for closing the said spiral slots, causing the lugs upon the sheath to travel backward in a straight slot, and allow the sheath to remain at rest when a new plate is to be inserted; and a mechanism for connecting and disconnecting (at the proper intervals of time) the pitman of the machine with the sheath reciprocating devices.

178,874.—*Time Lock*.—Thos. W. Spencer, Circleville, Ohio.—June 20.

178,896.—*Underground Tube for Propulsion of Cars*.—Andw. S. Hallidie, San Francisco, Cal.—June 20.

A series of openings are formed at intervals along the tube, so that the grapping device may be withdrawn from the tube when desired.

178,875.—*Rotary Steam Boiler*.—Reissued.—Charles W. Pierce, New York, assignor to the Pierce Rotary Tubular Boiler Company, same place.

Patent No. 166,807, dated Aug. 17, 1875; reissue No. 6750, dated Nov. 16, 1875.—June 20.

The discharge valve is operated by a handle that connects from the slab at the side of the basin down to the valve at the center of the basin, where the plug is usually employed.

178,924.—*Pipe Cutter*.—George P. Jacobs and Jacob Jamer, Brooklyn, N. Y.—June 20.

The square holder is slotted at one of its corners to permit the cutter to pass through; is removable by withdrawing the cutter from this slot; is hinged in two portions, and, when removed from its socket, unclamped by a thumb-screw, to admit of different sized pipe sizes.

178,936.—*Valve for Basins*.—John Doyle, Hoboken, N. J., and Stephen Bayles, New York, N. Y.—June 20.

The discharge valve is operated by a handle that connects from the slab at the side of the basin down to the valve at the center of the basin, where the plug is usually employed.

178,944.—*Pipe Cutter*.—George P. Jacobs and Jacob Jamer, Brooklyn, N. Y.—June 20.

The square holder is slotted at one of its corners to permit the cutter to pass through; is removable by withdrawing the cutter from this slot; is hinged in two portions, and, when removed from its socket, unclamped by a thumb-screw, to admit of different sized pipe sizes.

178,956.—*Sheet Metal Can*.—George H. Chinck, Brooklyn, N. Y.—June 20.

Places the wire in a cut or swaged thin portion of the rim or top of the cover.

178,967.—*Funnel Tong*.—Geo. B. Clarke, Leonardsville, N. Y.—June 20.

A device for holding funnels while pouring into a jug or other receptacle; and, also, in combining with such a funnel a heating iron, for the purpose of making viscous substances pass through the funnel quickly in cold weather.

178,968.—*Valve for Basins*.—John Doyle, Hoboken, N. J., and Stephen Bayles, New York, N. Y.—June 20.

The discharge valve is operated by a handle that connects from the slab at the side of the basin down to the valve at the center of the basin, where the plug is usually employed.

178,976.—*Time Lock*.—Thos. W. Spencer, Circleville, Ohio.—June 20.

178,986.—*Underground Tube for Propulsion of Cars*.—Andw. S. Hallidie, San Francisco, Cal.—June 20.

A series of openings are formed at intervals along the tube, so that the grapping device may be withdrawn from the tube when desired.

178,984.—*Rotary Steam Boiler*.—Reissued.—Charles W. Pierce, New York, assignor to the Pierce Rotary Tubular Boiler Company, same place.

Patent No. 166,807, dated Aug. 17, 1875; reissue No. 6750, dated Nov. 16, 1875.—June 20.

Water buckets encircle each of the outer series of tubes, by which water is carried up and over the water level in the boiler.

An ingenious mechanic in St. Louis has invented what he calls a "steam hand car" for the use of railway laborers, which, according to the St. Louis Republican, is propelled by a "stationary engine" on the car. A "steam hand-car" is a curiosity, but how the inventor expects to move it at the rate of 25 miles an hour by means of a "stationary engine," unless he projects it like a shot out of the St. Louis gun, we fail to comprehend. The confusion of terms, for which the Republican is doubtless responsible, is only equalled by that of the Dutchman, who wanted an empty barrel of flour to make his dog a hen coop.

USE THE BEST.



Pawtucket, R. I.

The American File Company have the exclusive right to use the Bernot process for cutting files. By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth. They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained. No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

Price lists and information furnished on application.

AMERICAN FILE CO., Pawtucket, R. I.

THE BEST IS THE CHEAPEST.

McCaffrey's Standard American Hand Cut Files and Rasps are warranted to do more work than any other files and rasps in the market.

SILVER MEDAL



TRADE MARK.



HIGHEST PREMIUM.

ELLIS G. HELLER.
PETER J. HELLER.GEO. E. HELLER.
JOHN J. HELLER.

We invite the attention of the trade to our Celebrated American

Horse Rasps
and Files.

made from the very best American Steel, all cut by hand, and warranted to give entire satisfaction. If requested, we will send sample lots, to be returned or held subject to our order, free of all charges, if not found as represented. All Rasps not stamped as the annexed incorporated trade mark are not genuine. Sold by Hardware dealers generally.

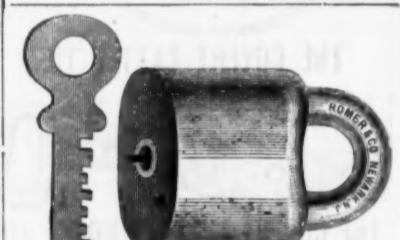
Established 1856.

FILES &
RASPS,

Best Cast Steel.
HAND-CUT. Manufactured by
JOHNSON & BRO.
No. 1 Commercial Street, Newark, N. J.

Putnam's Government Standard
FORGEDHammer Pointed
HORSE SHOE NAILS,
READY FOR DRIVING.

Manufactured from the best of NORWAY Iron, and warranted to give entire satisfaction.

S. S. PUTNAM & CO.,
NEPONSET, MASS.

ROMER & CO.,
Established 1857. Manufacturers of Patent Scandinavian or Jail Locks, Brass Pad Locks for Railroads and Switches, etc., Patent Door Locks, R. R. Car Door Locks, Patent Planer and Sewing Machine Locks, 141 to 145 Railroad Avenue, NEWARK, N. J.
Illustrated Catalogue sent on application.

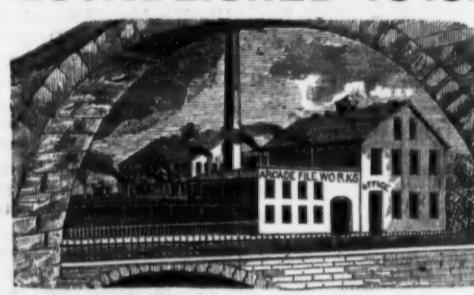
PENNSYLVANIA FILE WORKS.
McCAFFREY & BRO.,

No. 1732, 1734 & 1736 North Fourth St., Phila.

Mears, ARNOLD & CO., 310 California St., San Francisco. Sole Agents for the Pacific Coast.

ESTABLISHED 1848.

C. T. DRAPER & CO.
Sing Sing, N. Y.
Manufacturers of SUPERIOR
HAND CUT



FILES and RASPS
Made from Best
ENGLISH CAST STEEL.
Quality guaranteed when required.

AUBURN FILE WORKS,
Superior Hand-Cut
FILES AND RASPS,
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.
FULLER BROS., Sole Agents,
89 Chambers and 71 Reade Streets, N. Y.Hiscox File Manufacturing Co.,
WEST CHELMSFORD, MASS.,
MANUFACTURERS OF EVERY DESCRIPTION
OF

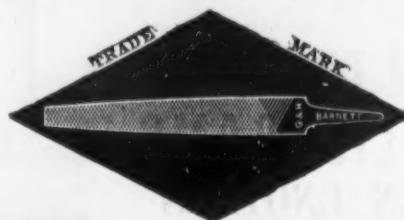
FILES and

RASPS.

Alfred Field & Co.,
93 Chambers & 75 Reade Sts.,
NEW YORK CITY,
GENERAL AGENTS.

All Goods Warranted.

Black Diamond File Works.

Send for Illus.-
trated Price List.Send for Illus.-
trated Price List.

G. & H. BARNETT. 39, 41 & 43 Richmond St. Phila.
LINFORTH, KELLOGG & CO.

Sole Agents for the Pacific Coast, 3 & 5 Front St., San Francisco, Cal.
St. Louis, Mo., SEMPLE, BIRGE & CO., Agents.
THOS. TAYLOR, 43 Chambers St., N. Y., Agent for N. Y. and N. E. States.

Established 1816.

Peter A. Frasse & Co.,

95 Fulton Street, New York,

SOLE AGENTS FOR

Thomas Turner & Co.'s Suffolk Works,
SHEFFIELD.

FILES AND HORSE RASPS,

And Importers of

P. S. STUBBS' FILES, TOOLS & STEEL,
W. J. Davies' Sons' London Emery Cloth,
HUBERT'S FRENCH EMERY PAPER.

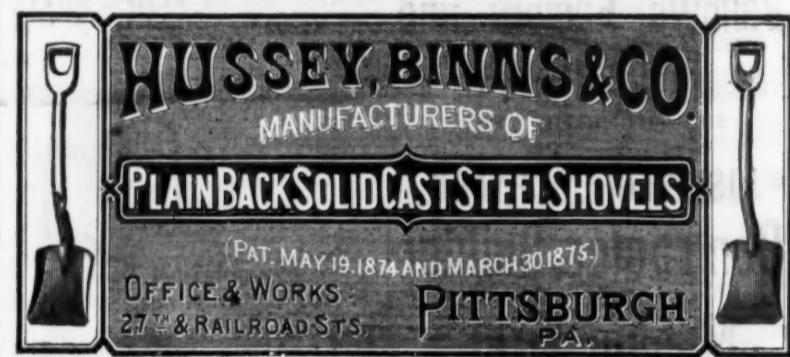
CHARLES B. PAUL,
FILES.Manufacturer of
HAND-CUT

CAST STEEL.

187 Tenth Street, Williamsburg, New York.

All descriptions of Files made to order. Price List mailed on application.

Established 1863

OLD COLONY IRON CO.,
Taunton, Mass.,
MANUFACTURE

Nails, Shovels, Spades, Scoops, &c.
SOLID CAST STEEL GOODS MADE TO ORDER.

Warehouse, 211 Pearl St., N. Y.

P. O. Box 1267.

A. L. REID, Agent.

GEORGE T. RICHARDSON. FRANK H. SCUDDER.
Middleboro' Shovel Co.,
MANUFACTURERS OF
Solid Cast Steel (Antrim) Cast Steel and Iron
Shovels, Scoops and Spades.

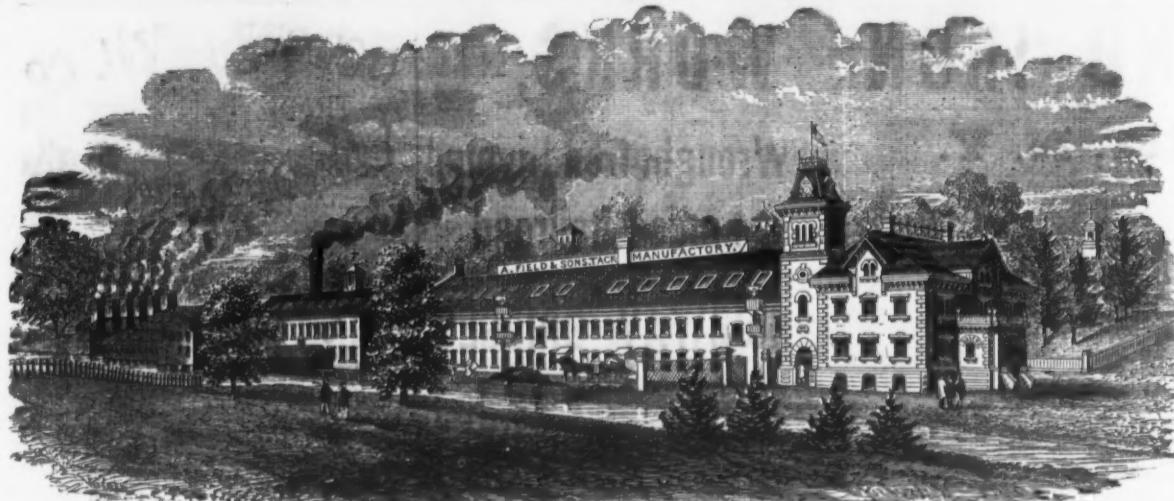


OFFICE AND SALESROOM, 63 Oliver Street, Boston.
WORKS, Middleboro', Mass.
J. CLARK WILSON & CO., New York Agents, 81 Beekman Street.

ESTABLISHED IN 1837.
GEORGE PARR,

Manufacturer of
Socket Firmer, Framing, Corner, Coach Makers' & Farmers' Socket Chisels, Carpenters' Sicks, Tang Firmer Chisels & Gouges, Socket Gouges, Millwrights', Paring & Turning Chisels & Gouges, Razor & Oval Blade Coach Makers', Wagon Makers' & Farmers' Drawing Knives, Shingle Shaves, Carving Tools, Boring Machines, Tool Chests, Awl Blades, Brad Awls & Tools, Peg Breaks, Awl Hafts, &c.

Consult your interest by sending for our prices before placing your Fall orders.
GEORGE PARR, - - Buffalo, N. Y.



A. FIELD & SONS, TAUNTON, MASS., Manufacturers of COPPER & IRON TACKS, TINNED TACKS, SUPERIOR SWEDES IRON TACKS, for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

American and Swedes Iron Shoe Nails,

Zinc and Steel Shoe Nails, Carpet, Brush and Gimp Tacks, Common and Patent Brads, Finishing Nails, Annealed Trunk and Clout Nails, Hob and Hungarian Nails, Copper and Iron Boat Nails, Patent Copper Plated Tacks and Nails.
Fine Two Penny & Three Penny Nails, Channel, Cigar Box & Chair Nails, Leathered Carpet Tacks, Glaziers' Points, Etc.
OFFICES AND FACTORIES AT TAUNTON, MASS. WAREHOUSE AT 78 CHAMBERS STREET, N. Y.,
where may be found a full assortment of Tacks, Brads, &c., for the accommodation of the New York Wholesale and Jobbing Trade.
Any variations from the regular size or shape of the above named goods made from samples, to order.

Hoisting
Machinery
Manufactured by
Crane Bros. Mfg. Co.,
CHICAGO.

COOKE & BEGGS, Agents, 16 Cortlandt Street, New York.

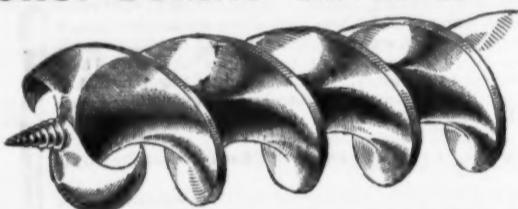
THE DOUGLASS MFG. CO.,

New York Warehouse, 62 Reade Street. P. O. Box 2610.

FACTORIES, Seymour, Conn.

MANUFACTURERS OF

COOK'S BORING IMPLEMENTS.



These goods have been in use over twenty years. We have reduced our List Price of Cook's Augers and Bits. Discounts remain unchanged.

JOHN CHATILLON & SONS, 91 & 93 Cliff St. N. Y.
Our Springs are used by the U. S. Government, and various Meteorological and other Scientific Institutions.

Chisels, Gouges and Drawing Knives of all kinds, Screw Drivers, Screw Driver Bits, Cook's and Douglass Mfg. Co.'s Augers & Bits, Wood and Metal Head Gimlets, Improved Hollow Augers, Blake's Patent Extension Bits, Boring Machines, Chisel Handles, Wood Boxes, Tool Chests.

Our New Catalogue, issued July 1st, will be furnished upon application.

THE HURRICANE FORGE. (PATTERSON'S PATENT.)

Also Stationary Forges.

Large Size, superior to stone or brick. Can be used with bellows or fan. Send for prices and further information to

GEORGE PLACE, General Agent,

121 Chambers & 103 Reade Sts., N. Y.

Forge without Hood.
Forge with Hood.



CLARK & CO.'S
PATENT
Self-Coiling, Revolving
NOISELESS
STEEL SHUTTERS
FOR
Store Fronts & Rear Windows.
FIRE AND BURGLAR PROOF.
Also, SELF-COILING
Wood Shutters

In various kinds of wood, suitable for Store Fronts, Private Houses, Offices, and School Partitions.

The Best & Cheapest Shutters in the World.

All local Estate owners are invited to inspect them at the factory.

162 & 164 West 27th Street, New York.

And at London, Paris, Vienna, Melbourne, &c.

Champion Centennial MATCH SAFE.

Exposing one match at a time. Plain, \$10 per gross. Ornamental, \$12 per gross. Agents wanted in every county throughout the State.

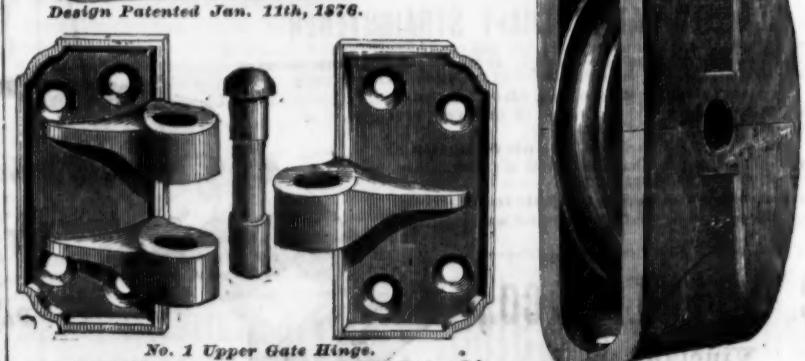
PRICE EVANS,
Sole Owner of Patent.

638 Greenwich St., N. Y.

TRANSFER ORNAMENTS

For Tin, Japan Ware, Seats and Carriage Manufacturers, etc. For sale by JUlius FECHTELER, 164 John St., N. Y. still my Carriage Ornaments to dealers only.

CLARK & CO., MANUFACTURERS OF BUILDERS' HARDWARE. BUFFALO, N. Y.



BUSINESS ITEMS.

CONNECTICUT.

The Winchester Arms Company are working nights now, and have 1000 hands employed. They will be kept at work until the contract with the Turkish government is completed.

PENNSYLVANIA.

The Pennsylvania Transportation Company, who propose to lay a pipe line to the seaboard for the transportation of oil, have made a contract for 300 miles of pipe to be used in its construction.

The two Paxton Furnaces, Harrisburg, have been idle, one for 18 months and the other for 12 months. The former starts at once, and the other as soon as it can be got ready—perhaps a month or two.

The Lochiel Mill, Harrisburg, broke a portion of its rail mill machinery last week, and will be idle for a week or so.

The Shenango Furnace No. 2 was blown in on Monday week.

The new hoop mill of Messrs. Kimberley, Carnes & Co. was blown in on Tuesday, and in a few days will be in full operation, as is the balance of their establishment.—*Sharon Herald*.

The Shenango Furnace No. 2 was blown in on Monday week.

The new blowing engine built for Mount Hope Furnace, at the Weimer Machine Works, Lebanon, has been thoroughly tested at the works the past few days, and has given the most perfect satisfaction. It is similar to the one placed on exhibition at the Centennial by Mr. Weimer, and which has attracted much attention. We learn that inquiries are made from different parts of the country about the engine—the cost, capacity, &c., and the prospects now are that Mr. Weimer will soon have a substantial appreciation of his genius in this direction by numerous orders.

Grubbs' St. Charles, of Columbia, and Chickies No. 2 furnaces, out lately, are now undergoing necessary repairs, and will start up again in a few weeks.

PITTSBURGH AND VICINITY.

The Lucy Furnace blew out on Thursday last for repairs—relining. Work on the new stack is suspended for the present.

Five miles above Kittanning, Armstrong county, at the mouth of Pine Creek, the Midland Oil and Mining Company are boring an oil well to the depth of 1008 feet. They have struck a vein of gas sufficient to fill a four inch gas pipe; the blaze of the gas burned extends some 20 or 30 feet, and it is thought that it will furnish an abundant supply of fuel for the Kittanning Rolling Mill, which is now owned by Meredith, Yetzel & Co. This mill has been idle about two years. If the gas will yield as well as expected—and there is every reason to believe it will—the managers of the rolling mill will, it is said, start up in a short time, giving employment to nearly 200 men.

Messrs. Jones & Laughlin are shipping some 15 cars of cotton ties per day.

The iron works of Lloyd & Black, on Second Avenue, have shut down, and extensive repairs are now being made to the machinery and furnaces.

The glass manufacturers have taken in hand, it is said, the subject of freight discrimination, and at a recent meeting a committee was appointed to visit the railroad authorities and ask relief. The result of the interview, if yet held, has not been announced.

Lewis, Dalzell & Co.'s new pan mill, in Sharpsburg, is doing the most thriving business of the place, and it will do a more thriving one when the boys engaged in it have learned their work. More than 5000 pans a day are made there now, and made entirely by machinery. One machine cuts the plate, another presses it into shape, and a third fastens on the wire rim. The pans are bread or dripping pans, and without a seam. The demand for them is so great that last week the firm had to buy sheet iron, their own sheet mill not being able to make enough.

A gentleman named Call, who has a patented process for making gas out of the refuse at coal mines, is putting up a furnace at Sharpsburg to make gas for use as fuel in Lewis, Dalzell & Co.'s mill. He claims that in the small furnace now going up he can produce gas enough to supply the entire mill. The expense of making it he expects to be light, and in consequence expects to effect a great saving in labor and money by doing away with the use of coal. The firm owning the mill furnish the means necessary to test the process, and if it prove all right the firm are to be entitled to a free use of it. The patentee is sanguine of success, as he has tested his invention in glass works.

OHIO.
The Standard Oil Company, Cleveland, have just given an order for 4000 tons of barrel hoops.

The Sheridan coke ovens seeming to answer all expectations, the erection of a furnace near those coal works is spoken of.

The Ironton Register says: An experienced furnace man informs us that it costs the price of just enough coal to make a ton of iron for a furnace to stop on Sunday—that is about \$9.

Furnaces in Ironton are paying the following prices for iron ores, delivered: Red limestone, \$3 to \$3.25; gray limestone, \$2.35 to \$2.50; red block, \$2.35 and \$2.50.

The Glasgow-Port Washington Furnace is out of blast.

Twelve hundred tons of coal have been shipped by the Cleveland Rolling Mill Company to their works at Marquette. The new wire mills of this company are completed and in successful operation. They are building an iron hoist house for No. 1 blast furnace, to take the place of a wooden one.

The Dayton Saw Works have not removed to Chattanooga, as has been so widely reported. They have started a branch shop, but will continue the Dayton Works on an enlarged scale.

Howard Furnace is still running on stone

coal, and is about the only one of the old charcoal furnaces that is making it a success.

The furnace of the Iron and Steel Company, Ironton, which was at last report being shoveled out, is again in blast. We trust it got well off this time.

Belfont mill and furnace will go to work about the 1st of September.

The Burgess Steel Works, of Portsmouth, after a week's suspension, resumed on Monday. The Cleveland Axle Manufacturing Company are running their works on a fair average production, and have a good trade. They make a homogeneous steel carriage and wagon axle specialty.

KENTUCKY.
A part of the housings of the old Union Mill, the first built in Pittsburgh, are in use at the mill of Mitchell, Tranter & Co., Covington.

The Ashland Furnace blew in last week.

MICHIGAN.
According to the Marquette Mining Journal, the shipments of ore for the season up to the 2d inst. are as follows:

From Marquette.....	926,879
From L'Anse.....	37,945
From Escanaba.....	176,411
Total.....	1,131,235
Same period last year.....	996,068
Increase this year.....	44,873

The Republic is shipping from 800 to 1000 tons a day.

The Barnum is shipping 50 cars of ore per day.

The Salisbury will probably ship 20,000 tons this season.

The Spurr Iron Mine is working 80 men, and producing about 80 tons per day.

The Lake Superior Mine had shipped, up to the 28th of June, 1876, 1,175,000 tons, the largest output of any mine in the region.

The Negussee (L. S.) Herald says: "The McComber Mine has increased its force somewhat, and proposes to ship 30 cars of ore per day, from now until the close of navigation. The Morgan Furnace is in full blast, and the Menominee will go into blast in a few days. At the Michigamie Mine four shafts are now ready for working, and the new machinery has capacity for raising 1000 tons of ore per day. This is, we think, the most powerful machinery in the iron district. Forty cars of ore per day are being shipped from the Winthrop Mine, and it is probable that the amount will be kept up through the season. Pretty good for one of the small mines."

The largest cargo of ore ever carried from this port was taken out last week by the schooner Hazard; 1830 gross tons, or nearly 1800 net tons, is what she managed to get away with.—Escanaba Tribune.

MISSOURI.
The Irondale Furnace is being repaired and put in most excellent condition. The engine cylinder was damaged so greatly that a new one has been put in. It is intended to be ready to go back into blast about the first of September.

The Hamilton Furnace, one of the few Missouri charcoal furnaces that ran through the winter, on account of continued high water cutting off the ore supply, has been driven out of blast.

The Statue of Liberty for New York Harbor.

A fragment of the great statue of Liberty, destined for Bedloe's Island, was put ashore at pier 57, North River, on Monday, from the French steamer Labrador. It was contained in a huge case, as large as a small dwelling, made of boards nailed rudely together, with open spaces between. All of the statue it held was the wrist and right hand, with a section of the torch which the right arm is to hold aloft, bearing a flambeau, which will serve as a lighthouse beacon. The vast case rested on a truck and was an object of much curiosity to the people around the docks. The French sailors, of the Labrador, fairly danced around it in their enthusiasm, calling on those in the vicinity, whom they guessed were Americans to come and "see the tomb." The thumb, which partly encircled the torch (a huge cylinder of twelve feet in circumference) was a ludicrously gigantic member. On the thumb nail alone a man of several hundred pounds avordupolis might find a more roomy seat than in a Third avenue car. As for the arm below the elbow and opening into the palm of the hand three men of ordinary stature might walk abreast within its interior. It is said that inside the upper and broader part of the arm above the elbow as many as nine men can be comfortably accommodated. This fragmentary part is made of brozied copper, about a sixteenth of an inch in thickness. It is in fine, evenly rolled plates, riveted and screwed together in the firmest and most elaborate manner. The completed statue will be about 120 feet in height, from the crown of the head to the sole of the foot, the elevation of the pedestal being, perhaps, a third of the altitude of the statue.

A gentleman named Call, who has a patented process for making gas out of the refuse at coal mines, is putting up a furnace at Sharpsburg to make gas for use as fuel in Lewis, Dalzell & Co.'s mill. He claims that in the small furnace now going up he can produce gas enough to supply the entire mill. The expense of making it he expects to be light, and in consequence expects to effect a great saving in labor and money by doing away with the use of coal. The firm owning the mill furnish the means necessary to test the process, and if it prove all right the firm are to be entitled to a free use of it. The patentee is sanguine of success, as he has tested his invention in glass works.

OHIO.
The Standard Oil Company, Cleveland, have just given an order for 4000 tons of barrel hoops.

The Sheridan coke ovens seeming to answer all expectations, the erection of a furnace near those coal works is spoken of.

The Ironton Register says: An experienced furnace man informs us that it costs the price of just enough coal to make a ton of iron for a furnace to stop on Sunday—that is about \$9.

Furnaces in Ironton are paying the following prices for iron ores, delivered: Red limestone, \$3 to \$3.25; gray limestone, \$2.35 to \$2.50; red block, \$2.35 and \$2.50.

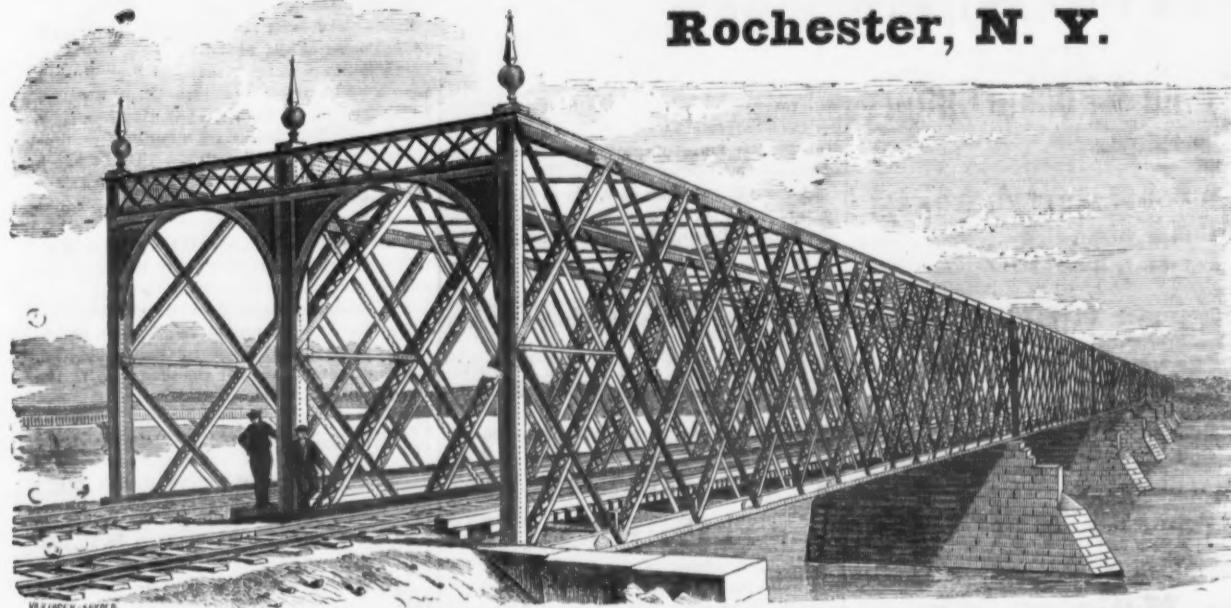
The Glasgow-Port Washington Furnace is out of blast.

Twelve hundred tons of coal have been shipped by the Cleveland Rolling Mill Company to their works at Marquette. The new wire mills of this company are completed and in successful operation. They are building an iron hoist house for No. 1 blast furnace, to take the place of a wooden one.

The Dayton Saw Works have not removed to Chattanooga, as has been so widely reported. They have started a branch shop, but will continue the Dayton Works on an enlarged scale.

Howard Furnace is still running on stone

LEIGHTON BRIDGE AND IRON WORKS, Rochester, N. Y.



SPRING PERCH CO., Bridgeport, Conn.

Established 1843. Manufacturers of FIRST QUALITY

SPRINGS & AXLES

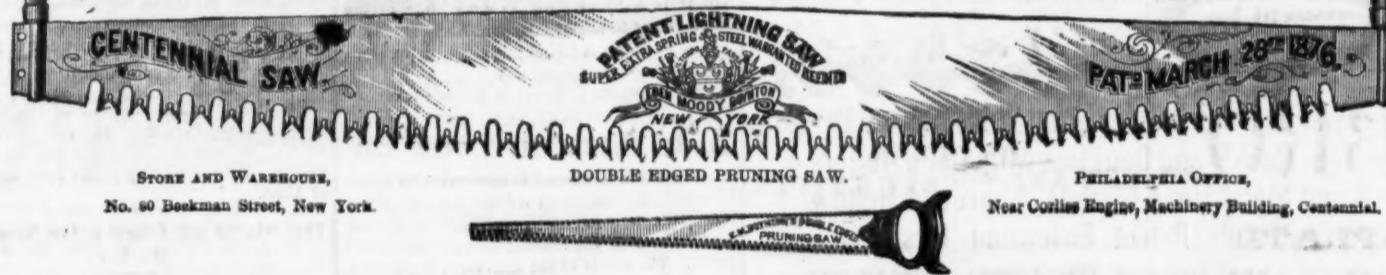
And Beer's Patent Curtain Rollers, Concealed Hinges, Etc., Springs of any pattern made to order. Send for Circular and Price List.

Any Dealer is aware that in an ordinary Hand Saw, the front cut is the effective cut, and drawing back: the saw has little effect by reason of the slant edges riding over the fiber, as the Saw is drawn back. The difference between the front cut of a Hand Saw, and the back cut, is the difference between the Lightning Saw teeth and all others; for all other saws are set one point and ride on slant edges. By setting two points of my M on the same side and the next two on the other, I conceal the slant between them, and operate wholly by the outside of a nearly vertical M tooth. Standing nearly vertical the two points of the M occupy the same space as the old V tooth. One point only is cutting and the other follows in the slot behind it to cut in the same manner, in the return motion, thus doubling the cut upon the same base and space of tooth. This construction also gives the breadth and durability of nearly an inch of steel instead of a single slender scraping point, and presents the upright instead of the slant edges to the timber. Any one can in a moment test the principle by comparing the front and back cut of any V tooth Hand Saw. My new patent of March 29th, 1876, allows the saw-dust perfect clearance; the arch slightly widening to the points of teeth renders it impossible for green or resinous saw-dust to be retained, while the slightly increased breadth at base of tooth gives the durability so much advocated by parties who have round-edged files for sale. Slightly pyramidal, the outer edges are as upright as the front cut of a Hand Saw, and the back slant cut is concealed in no other Saw than mine, by setting the two points of M to cut in line instead of alternately. Thus by this new Patent I avoid all "overhang or under-cut," avoid all tearing, and to the matchless speed of the Lightning dress and set, add the durability, simplicity of sharpening, and sweet cutting so much admired. I thus adapt the Lightning teeth to universal use, in all Hand, Pruning, Buck, and Cross-Cut Saws. The concave in the centre of the M saves file, and renders it impossible to file the tooth out of shape. A 10-inch Cant File and Set fitting the M is furnished for forty cents, that will file ten saws easily.

A 16-inch log was sawed off in 17 seconds by hand with a Lightning Cross-Cut Saw, at Pennsylvania State Fair, on September 30th, 1874, before President Eby; W. B. Lawson, S. S. Hosgland, and other officers of the State Board, timing.

\$1000 challenge to any responsible saw manufacturer, to match the Lightning saws in speed of cutting and ease of sharpening. This patent saw tooth has recently been vindicated by U. S. Court decreeing costs and damages for infringements. Beware!

POOR GOODS ARE NEVER IMITATED.



STORE AND WAREHOUSE,
No. 60 Beekman Street, New York.

DOUBLE EDGED PRUNING SAW.

PHILADELPHIA OFFICE,
Near Corliss Engine, Machinery Building, Centennial.

THE HARTFORD FOUNDRY AND MACHINE CO.,

Successors to the
WOODRUFF & BEACH IRON WORKS,
Hartford, Conn.

High & Low Pressure Marine & Stationary

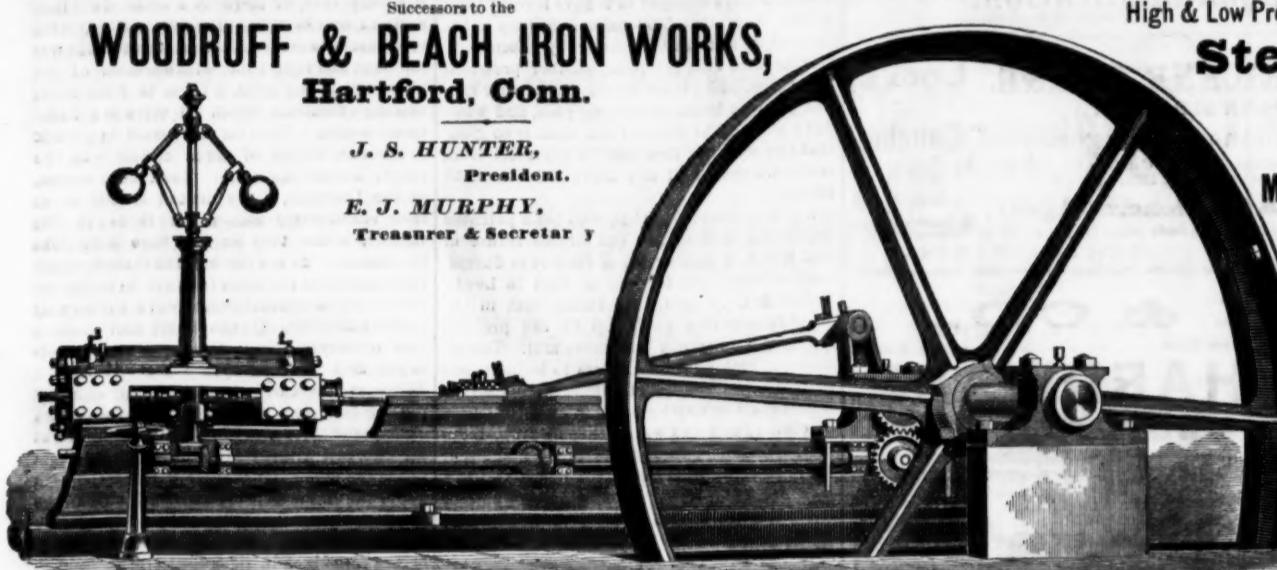
Steam Engines

AND

Boilers,

Mining, Powder and Paper Mill
Machinery,

And every Variety of Iron and Com-
position Castings made
to order.



The following are a portion of the Engines manufactured at these works and are a sufficient guarantee of our capacity for doing first-class work, viz.: The Pumping Engines in the cities of Brooklyn, N. Y.; St. Louis, Mo. and Hartford, Conn., and in the Charlestown, Mass., and Norfolk, Va. Navy Yards, and the engines in the U. S. Steam Sloops of War Michigan, Niagara, Maine, Colorado, and Wisconsin and the Gun Boats Cayuga, Pequot and Nipsec, the Government Transports Dudley Buck and Geo. C. Collins, and the Steamships America and United States. Also the large Horizontal Engine for the new Plate Mill of the Bay State Iron Co.

TEN EYCK AXE MFG. CO.,

COHOES, N. Y.

Warehouse, 103 Chambers Street, NEW YORK.

Manufacturers of **AXES** of all Kinds.

Hatchets, Adzes, Grub Hoes, Mattocks & Picks.

Sole Manufacturers of the "WASHOE" PICK.

Catalogues and Price Lists furnished upon application.

RHODE ISLAND HORSE SHOE CO.,
OFFICE, 81 Canal Street, Providence, R. I.

Manufacturers of

WORKS at Valley Falls, R. I.

PERKINS and RHODE ISLAND PATTERNS OF

HORSE AND MULE SHOES.

C. SCOFIELD'S STRAIGHTENER OR BENDER, For Shafting, Axles, Tubes, Rails, &c.

There has long been a want of some device by which the straightening of shafting could be done without removing the work from the centers, and at the same time do it quickly and ac-

curately. The

SCOFIELD PATENT SHAFT STRAIGHTENER

meets just such a want; the apparatus is light and can be easily handled, yet it is of sufficient strength for the purpose required. It can be placed upon the shears of the lathe, and moved along the entire length of the work. It is especially

Adapted to Removing Short Holes,

which frequently occur in long lengths of shafting. The lightness of

Adapted for Line and Counter-Shafting,

without necessitating the time and trouble of removing hangers and detaching couplings, but can be

Easily applied to the Shaft while in Position.

It can also be used on the bench for short lengths.

For Circulars, Price List, &c., Address,

C. SCOFIELD & CO.,

Vineland, N. J.



OSBORN MFG. CO.
TRADE MARK
BLEEKER ST. NEW YORK

OSBORN'S METAL O CAGES.
BRIGHT



The Original Inventors and Manufacturers of the
OSBORN BRIGHT METAL CAGES.

Also OSBORN & DRAVTON improvements under
twelve different patents. We are continually bringing
out new and better designs to meet the demands of
refinement and taste.

ALVAN DRAVTON, General Agent.

JOHN MAXHEIMER,
Manufacturer of
Japanned & Patent Eureka Bright Metal
BIRD CAGES,

247 and 249

Pearl Street,
NEW YORK.

FULL SIZE 07
WIRE CONNECTION
Patented June 3, 1862;
April 6, 1869; Dec. 28, 1873;
Jan. 30, 1874; Dec. 22, 1874;
April 30, 1875.



BLAKEMORE'S GRAVITY DOOR ALARM 23.73
USE NO
MANUFACTURED 3425 MARKET ST PHILA
CIRCULAR

H. CARTER
290 Pearl Street, New York.

POTTER'S PATENT
STEP LADDERS.
Manufacturer of and Dealer in all descriptions of
Moulders' and Plasterers' Tools,
And Dealers in
General Hardware, Gilded Copper Weather Vanes,
CARTERS' PATENT CARRIAGE LIFTING JACK, &c.

JAS. CLAYTON,
Manufacturer of
Water, Air, and
Vacuum Pumps and
Air Compressors.
Send for Illustrated Cir-
culars.
11 & 16 Water St.,
Brooklyn, N. Y.

Tackle Blocks
Of all Description.
SHIP BLOCKS,
Well and Ships'
PUMPS.
Patent Pressed PUMP LEATHERS.
Dealer in LIGNUMVITÆ WOOD.
JOSEPH THOMPSON,
Factory, 36 Burling Slip, 86 South Street,
NEW YORK.

TACKLE BLOCKS
BURR & CO.,
Manufacturers of Waterman and Russel's
Patent Iron Strapped Blocks,
ALSO MANUFACTURERS OF
ROPE STRAPPED BLOCKS,
31 PECK SLIP, NEW YORK.

Cutlery.



FRIEDMANN & LAUTERJUNG,

Manufacturers of
Pen and Pocket Cutlery, Solid Steel Scissors, Shears, Razors,
Russia Leather Straps, Hones, &c.

Sole Proprietors of the renowned full concaved patent
"ELECTRIC RAZORS,"
And the **"ELECTRIC SHEARS."** Nickel Plated
Bows.

Agents for the BENGALL RAZORS.

AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.
91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.

THE MILLER BROTHERS CUTLERY CO.,

Manufacturers of
PATENT FINE PEN & POCKET CUTLERY
WEST HEPBURN, CONN.

The only Knives made that are put together in such a manner that there is no strain on the covering or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any made, and are acknowledged by English makers as the **Best American Knife.** We also make

NICKEL & SILVER PLATED POCKET KNIVES
which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal to any other knife. Orders filled from the factory, and in New York by **Messrs. J. Clark Wilson & Co.** No. 61 Beekman Street (who have a full stock of all patterns always on hand), and also by **Messrs. G. B. Walbridge & Co.**, No. 99 Chambers Street.

NAUGATUCK CUTLERY CO.,
Manufacturers of FINE PEN & POCKET CUTLERY.
FULLER BROS., Sole Agents, 89 Chambers and 71 Reade Sts., N. Y.

JOSEPH RYALS, Collinsville, Conn.,
Manufacturer of Patent



SHEARS & SCISSORS.
Made by a new process RECENTLY PATENTED which enables
me to produce goods in that quality, finish and general excellence surpass
any. All warranted Solid Cast Steel Blades.

ROGERS & BRO.,
MANUFACTURERS OF
FINE ELECTRO-SILVER PLATE
Spoons, Forks, Knives & Hollow Ware
IN GREAT VARIETY.
690 Broadway, NEW YORK.

Price List mailed on receipt of Business Card.

X. L. C. R. X. L. C. R.
EMANUEL MARX,
IMPORTER OF
Table & Pocket Cutlery,
Solid Steel Shears, Britannia Spoons, Britannia Soap Ladies' Toy Castors.
OFFICE & WORKROOMS, 58 Jersey Street, near Church, New York.

VAN WART, SON & CO.
Hardware Commission Merchants,
EXPORTERS AND IMPORTERS,
BIRMINGHAM, - ENGLAND,
Agents,

VAN WART & McCOY,
184 & 186 Duane Street, N. Y.

George H. Gray & Danforth,
88 India Street, Boston.

F. W. TILTON,
17 Old Levee Street, New Orleans.

At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for

John Rimmer & Son's Celebrated Harness and other Needles.

W. Clark's Genuine Horse Clippers.

Seydel's "Ashante" Pocket Hammock.

OSCAR IRVING VAN WART & CO.,
FORWARDING AGENTS.
2 South John Street, LIVERPOOL.

Young's Patent Folding Scissors.



Pat. May 25, 1872.
These Scissors are made of the very best steel, nickel plated and so constructed that they can be readily folded and carried in the pocket without injury to the garments. A sample pair will be sent by mail to the trade only, upon receipt of the retail price, namely:

For small size, either blunt or pointed..... \$1.00

Large size, pointed or half pointed..... \$1.50

New York, Feb. 1st, 1876.

MARX BROS., Proprietors,
430 Broadway.

Importer on Commission

HARDWARE, CUTLERY, GUNS, &c.

W. SANDERS, Agent,

76 Reade Street, N. Y.

Cutlery.

ESTABLISHED 1859.
NEW YORK KNIFE CO.

MANUFACTURERS OF SUPERIOR

Table & Pocket Cutlery,
WARRANTED TO BE MADE OF THE BEST
MATERIAL.

WALKILL RIVER WORKS,
Walden, Orange Co., New York.
THOS. J. BRADLEY, President.



CHEAP.
CHARLES FELDER,
89 Thomas Street,
N. Y.

JOSEPH S. FISHER,
No. 411 Commerce St., PHILADELPHIA

AGENT FOR

George Wostenholm & Son,
"Limited."
Washington Works, SHEFFIELD,

Celebrated I-XL Cutlery, Razors, &c.

AGENT FOR
WALTER SPENCER & CO.,
Steel and File Manufacturers,
Rotherham, ENGLAND.

Corporate Mark

W. SPENCER
ROTHAMPSHIRE

Granted 1777.

**AMERICAN
PEN AND POCKET KNIVES,**
MANUFACTURED BY **PEPPERELL,**
Aaron Burkinshaw, AB MASSACHUSETTS

My blades are forged from the best Cast Steel, and
warranted. To me was awarded the GOLD MEDAL of
the Connecticut State Agricultural Society; also a MEDAL
and Diploma from the Mass Mechanics' Ass'g., Sept. 1861.

WILSON BOHANNAN,
Manufacturer of Patent

BRASS

Pad Locks,

FOR
Railroad Switches,
Freight Cars,
AND THE HARDWARE TRADE.

All sizes, with Brass and Steel
Keys, with and without chains.

PASSENGER CAR LOCKS,
Bronzed, Nickel-Plated and Japanned.
BROOKLYN, N. Y.

Catalogues and Samples sent upon application.

GEORGE FOCHT,
Iron Foundry, Machine & Sheet Iron Works,
First and Adams Streets, Hoboken, N. J.

Inventor and Manufacturer of the
Celebrated Self-dumping Hoisting
Carts, Iron Coal
Carts, side or
bottom dumping
Iron Dock and
Hook Blocks, Iron
Blocks, Iron
Bars, Iron
Bars, Charging
Scops, etc.,
for Gas Works,
and Sheet Iron
Work, general
Improved Mast
Shoe and Gaff
Socket Castings,
and complete Iron Work for Mast and Gaff
and up fit if desired. Machinery, Building and other
Castings on hand and made to order. Illustrated Circular
and Price List sent on application.

All Clamp SKATES.

Improved All Clamp Club, New York
Club, Ladies' Skates, Standard Styles of
Wood Top Skates. New Pattern Japanned
Steel Top Skates with Heel Plates, the
Best low priced Skate in the market. A full line of

Winslow's Popular Skates.

BRADFORD & ANTHONY,

BOSTON, MASS.

Sole Selling Agents. Also Sole Agents in the

United States for Patent ACME Club Skates.

Send for general Skate Catalogue.

WINSLOW'S

Improved All Clamp Club, New York
Club, Ladies' Skates, Standard Styles of
Wood Top Skates. New Pattern Japanned
Steel Top Skates with Heel Plates, the
Best low priced Skate in the market. A full line of

Winslow's Popular Skates.

BRADFORD & ANTHONY,

BOSTON, MASS.

Sole Selling Agents. Also Sole Agents in the

United States for Patent ACME Club Skates.

Send for general Skate Catalogue.

W. M. MEeker & SON'S

MALLEABLE IRON HOLLOW MUN-

TEN WINDOW SASH.

For Insane Hospitals, Fire Proof Buildings, &c.

End view of

Muntin for Glazed Sash.

Patented June 9, 1876.

Hollow Muntin.

The use of these Sashes give perfect security without

the usual gratings that have a prison-like appearance.

Wherever introduced, has met with the most

Superintendents testify to their worth. Manufactured by

W. M. MEeker & SON, Newark, N. J.

Fine Castings of Malleable and Gray Iron, German

Silver and Composition; also Patterns a specialty.

WHELPLEY & STORER'S
Crushers & Pulverizers,

FOR ORES, COAL, CEMENT, PLAS-
TER, MINERALS, GRAIN,
Etc., at greatly reduced prices. Pulverized
fuel applied to the puddling and heating of Iron
and Steel.

LEVI R. GREENE, Trustee,
69 Kilby St., Boston, Mass.

ST. LOUIS
GALVANIZING
WORKSPYROMETERS
for BLAST FURNACES.

Edw. BROWN,
311 Walnut St., Philadelphia.

ALSO FOR SALE

PYROMETERS

For Baker's Ovens, Boiler Flues,
Galvanizing Baths, Oil Stills, Vul-
canizers, Superheated Steam.

Over 300 "Gauntlet" and 100
Portable Pyrometers are now in
use at Blast Furnaces.

E. Brown's Portable Blast Gauge
for the plug hole, Steam Gauges,
Blast Gauges, Mercury Gauges,
Recording Steam Gauges, Engine
Counters, Indicators for ascertain-
ing the Horse Power.

ALSO

REVOLUTION
INDICATORS.

which constantly indicate without the use
of a watch, the number of turns per minute
made by a Steam Engine.

D. H. MILLER LOCK CO.

712 Cherry St., Philadelphia, Pa.

Security, Durability, Convenience.

IMPROVED SELF-LOCKING
Brass Pad Locks.

Made in the most substantial and compact manner, and
are in every respect a superior article. We guarantee
that no two locks are alike, unless specially ordered.
Each lock furnished with two keys. Any number of
locks or keys may be ordered. Adopted by the United
States Government. Samples of No. 1 Lock sent to all
parts, see on receipt of \$1.00. Liberal Discounts

DYNAMO-ELECTRIC MACHINES

For Electroplating

NICKEL, GOLD, &c.,

and other purposes. Send for Illustrated Circular.

W. HOCHHAUSEN,

132 William Street, NEW YORK.

D. M. MEEKER & SON'S

MALLEABLE IRON HOLLOW MUN-

TEN WINDOW SASH.

For Insane Hospitals, Fire Proof Buildings, &c.

End view of

Muntin for Glazed Sash.

Patented June 9, 1876.

Hollow Muntin.

The use of these Sashes give perfect security without

the usual gratings that have a prison-like appearance.

Wherever introduced, has met with the most

Superintendents testify to their worth. Manufactured by

W. M. MEeker & SON, Newark, N. J.

Fine Castings of Malleable and Gray Iron, German

Silver and Composition; also Patterns a specialty.

Foreign Opinions of the United States.

GEORGE GUEUTAL & SON,
39 West 4th St., New York.
IMPORTER OF
Wood Screws, Steel in Sheets,
BAND SAWS. TOOLS FOR BRAZING, &c.
Bed Screws, Pin Hinges, and Wire Nails a Specialty.

HARVEY W. PEACE.

JOHN HOGAN.

PEACE & HOGAN,
VULCAN TRADE MARK. SAW WORKS.

MANUFACTURERS OF EVERY KIND OF

Patent Ground Saws,CIRCULARS CROSS-CUTS, MILL, MULAY, GANG, HAND, & BUTCHER.
Molding and Planing Knives, Plastering Trowels, Mitering Rods, &c.

FACTORIES:

Union Avenue, Tenth & Ainslie Sts., BROOKLYN, E. D., N. Y.
OFFICE & WAREHOUSE, 59 Beekman Street, New York.ESTABLISHED 1857. H. KNIPPERBERG.
E. C. ATKINS & CO., Indianapolis, Ind.,
Saw Manufacturers and Repairers.GENUINE SILVER STEEL DIAMOND X CUT SAW.
\$1.50 Per Foot.

BEWARE OF THE IMITATION CALLED "DIAMOND TOOTH." - 21

Wheeler, Madden & Clemson
MFG. CO.,
MIDDLETOWN, NEW YORK.
Manufacturers of

WARRANTED CAST STEEL
SAWS

Of every description, including

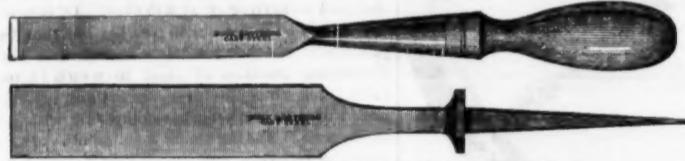
Circular, Shingle, Cross-Cut, Mill, Hand,
WOOD SAWS. Etc., Etc.**AMERICAN SAW CO.,**

Manufacturers of

Movable Tooled Circular Saws,
PERFORATED CROSS-CUT SAWS

And SOLID SAWS of all kinds.

Trenton, N. J.



BUCK BROTHERS, Millbury, Mass.

The most complete assortment in the U. S. of Shank, Socket Firmer, and Socket Framing Chisels.

PLANE IRONS.

Gouges of all lengths and circles beveled inside or outside. Nail Sets, Scratch and Belt Awls, Chisel Handles of all kinds. Orders filled promptly; generally same day as received.

PIONEER ANIMAL POKE.
The Old Reliable Pioneer Poke.
The only Poke made with an oil tempered Cast Steel Spring. Our Pokes are manufactured under the personal supervision of the proprietors themselves, from the very best selected Oak and Hickory Timber, and finished in the very finest style. We warrant our goods to be first-class in every respect. For further particulars and price please address.

BISHOP & BENEDICT, Berea, Ohio.

Morse Twist Drill and Machine Co.,
NEW BEDFORD, MASS., Sole Manufacturers of
Morse Patent Straight-Lip Increase Twist Drill,
Beach's Patent Self-Centering Chuck, Solid and Shell Reamers.

BIT STOCK DRILLS,

Drills for Coes, Worcester, Hunter and other Hand Drill Presses. Beach's Patent Self-Centering Chucks, Center and Adjustable Drill Chucks, Solid and Shell Reamers. Drill Grinding Machines. Taper Reamers, Milling Cutters and Special tools to order.

All Tools exact to Whitworth Standard Gauges.

GEO. R. STETSON, Supt.

EDWARD S. TABER, Treas.

**Philadelphia Star Bolt Works.****"STAR"**

Carriage and Tire Bolts,

From the Best Brands

of

NORWAY IRON.

The Celebrated

"STAR" Axle Clip.

All Styles of

FANCY HEAD BOLTS.

Blank Bolts, Skein Bolts, Square Head Bolts, Plow Bolts, &c., &c., &c.

TOWNSEND, WILSON & HUBBARD, 2301 Cherry St., Philadelphia, Pa.

THE ORIGINAL
TOMLINSON SPRING & AXLE COMPANY,

ESTABLISHED 1852.

Manufacturers of FIRST CLASS SPRINGS AND AXLES. Also, THE GROOT'S PATENT CROSS SPRING.

RUSSELL TOMLINSON, Pres.
S. R. TOMLINSON, Secy and Treas.
C. S. LUCFTON, Supt.

BRIDGEPORT, CONN.

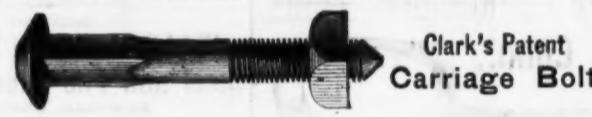
All orders promptly executed.

We have no branch. Please send your orders direct.

TURNED MACHINE SCREWS,
One-sixteenth to five-eighths diameter.
Heads and points to sample.
IRON, STEEL and BRASS.
Lyon & Fellows Mfg. Co.,
Cor. 1st and North 3d Streets, Williamsburg, N. Y.

CARRIAGE BOLTS.

Buy the Best.

Clark's Patent
Carriage Bolt.

Best Bolt manufactured for all kinds of agricultural machinery. Will not split the wood, and can not turn in its place.

MANUFACTURED BY

CLARK BROS. & CO., Milldale, Conn.

Also Manufacturers of

Plow and Machine Bolts, Coach Screws, Nuts, Washers, Tire Blanks, Rivets, &c.

Send for Illustrated Price List.

H. A. ROGERS,

BOX 4106. 19 John Street, NEW YORK.

SUPPLIES, in every variety,

For Railroads, Mills and Manufacturers.

Send for new Illustrated Catalogue, 272 pages.

D. ARTHUR BROWN & CO.
MANUFACTURERS OF
THE ORIGINAL
CONCORD AXLES
FACTORY AT FISHERVILLE, N.H.
BOSTON. FULLER, DANA & FITZ. 110 NORTH ST.
NEW YORK. VAN WART & MCCOY. 134 DUANE ST.
CHICAGO. THOS. J. KIRK & CO. 198 LAKE ST.

FORT PLAIN SPRING AND AXLE WORKS.**FOR FALL TRADE.**

All dealers in SPRINGS AND AXLES will find it to their interest to send to us for

Price List and Discounts.

CLARK, SMITH & CO., Fort Plain, N. Y.

W. C. BARKER & CO.,
Iron, Steel, Nails,
HEAVY HARDWARE, WAGON AND CARRIAGE MATERIAL, DRILLS,
ANVILS, BELLOWS, VISES, CHAINS, &c.
CHICAGO, ILLS.

The Cheapest and Best Gauge Cock made.
Baltimore Bell & Brass Works,
53 & 55 Holliday Street, Baltimore, Md.Manufacture all kinds of
Brass Work,
And keep on hand a full
supply of all
Goods used by Plumbers
Steam and Gas Fitters.

FRANKLIN S. MILES,
Manufacturer of
SCREWS.
205 Quarry Street, Philadelphia.



W. C. BOONE,
26, 28 and 30 Humboldt St., cor. Debevoise, Brooklyn, E. D., N. Y. Manufacturer of Standard
TURNED MACHINE SCREWS.
Case-Hardened Set, Cap and Gibb Screws, Hexagon Collar, and Drilled Head Screws, Agaraffes and Nose Bolts. Special Screws, Rivets, &c., made to order. Iron, Steel or Brass. Also Brass Knobs of all kinds made to order. Our Screws are made of the Best Low Moor or Norway Iron, and are uniform in size.

J. Billerbeck & Co.,
KEystone SCREW CO.,
Manufacturers of
IRON GIMLET - POINTED WOOD SCREWS.
17th & Venango Sts., Philadelphia.



BACKUS BROS.
Manufacturers of
GLASS OILERS & THE BACKUS WATER MOTOR
For Sewing Machines
And Other Uses.
Cor. Wright St. & Ave.
A. Newark, N. J.
Send for Circulars.



R. COOK & SONS,
Manufacturers of
Carriage & Wagon AXLES,
WINSTED, CONN.
ESTABLISHED 1839.

MINERS' CANDLES.
Superior to any other Light for Mining Purposes. Manufactured by
JAMES BOYD'S SON,
Nos. 10 & 12 Franklin St., N. Y.

H. D. SMITH & CO., Plantsville, Conn.,

Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

11 Warren Street, N. Y.

H. B. NEWHALL,

Agent for the Following Companies

EMMET HAMMER CO.,

Manufacturers of all kinds of

Hammers and Sledges and Contractors' Tools.

H. B. NEWHALL, Agent.

All our goods are branded "E. F. EMMET & CO., Brooklyn, N. Y."

None genuine without the above brand.

MACHINIST Ball, Straight and Cross Peen Hammers.

BLACKSMITH, Hand and Riveting Hammers.

" Sledges, Swages, Fullers, Flatters, hot and cold

Chisels.

HORSE SHOERS, Turning and Shoeing Hammers, Sledges, Pincers.

MINERS, Striking and Drilling Hammers.

QUARRY Sledges, Macadamizing Hammers.

MASON'S Hammers, Brick Hammers.

BOILERMAKERS, Riveting and Flogging Hammers.

COOPERS' Hammers, Drivers and Stakes.

RAILROAD and SHIP SPIKE Mails, &c., &c.

All kinds of

ANVIL TOOLS and STEEL FORGINGS

Made to order at short notice.



WM. H. HASKELL & CO.,

Pawtucket, R. I.

Manufacturers of

COACH SCREWS (with Gimlet Point),

all kinds of

Machine and Plow Bolts,

FORGED SET SCREWS AND TAP BOLTS.

H. B. NEWHALL, Agent.

STANDARD NUT CO.,

Pittsburgh, Pa.

Manufacturers of



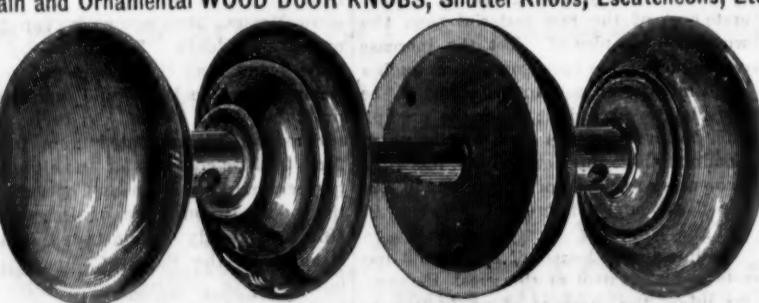
HOT PRESSED
Square & Hexagon Nuts.

R. R. FISH BARS,
BOLTS, SPIKES, RIVETS, &c.

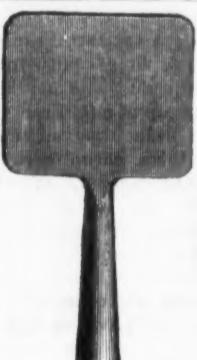
H. B. NEWHALL, Agent, 11 Warren Street, N. Y.

ORNAMENTAL WOOD COMPANY,
BRIDGEPORT, CONN., Manufacturers of

Plain and Ornamental WOOD DOOR KNOBS, Shutter Knobs, Escutcheons, Etc.



The above represents our new **PLAIN DOOR KNOB** which is unsurpassed for beauty of finish
durability and neat appearance. Can be furnished in Walnut, Oak, Ash, Maple, etc., etc.
Send for catalogue and price list.



THE BRADLEY MFG. CO., Syracuse, N. Y.

MANUFACTURERS OF

Wrought Iron CARRIAGE STEPS

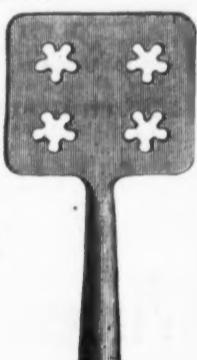
MADE WITH

Bradley's Cushioned Hammer

EQUAL TO THE BEST.

Liberal discount to the Trade.

Send for Prices.



CLARK'S PATENT EXPANSIVE BITS

Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other.

Two sizes: Large Size Boring, $\frac{3}{4}$ to 3 inches; Small Size Boring, $\frac{1}{2}$ to $1\frac{1}{2}$ inches.

WILLIAM A. CLARK, - - - - -

Manufactured by

Westville, Conn.



H. B. NEWHALL,

Agent for

PROVIDENCE TOOL CO.

WM. H. HASKELL & CO.

LEWIS, OLIVER & PHILLIPS.

ADAMANTINE FILE WORKS.

PENFIELD BLOCK WORKS.

EMMET HAMMER CO.

STANDARD NUT CO.

D. R. SPERRY & CO.,

Batavia, Ills.

Manufacture Stove Hollow Ware, in finish, design and convenience the **BEST** made. Also make all sizes of Cauldrons, Soap Makers' Kettles, Sugar Kettles, Drug Mortars, etc.

Lehigh University.

TUITION FREE.

Civil, Mechanical and Mining Engineering; Chemistry and Metallurgy; Classical Course; French and German; Latin Literature; International and Constitutional Law; Psychology and Christian Evidences.

Address: The Rev. John M. Lessvitt, D. D., Pres., Bethlehem, Pa.

JAMES HARDMAN, JR.,

71 John Street,

Presses & Dies, Jewelers' & Tinnery's

TOOLS, MADE AND REPAIRED.

Metal and Rubber Moulds,

All kinds of General Machinery.

PRICES THE LOWEST. Day-work, \$5 per day

Nuts, Bolts. Washers,

Etc.,

IN EVERY VARIETY.

Prices to suit the Times.

'Send for Catalogue and Discount Sheet

TO

UNION NUT COMPANY,

99 Chambers Street, New York.



The Iron Age.

New York Thursday, August 17, 1876.

DAVID WILLIAMS - - Publisher and Proprietor.
JAMES C. BAYLES - - Editor.
JOHN S. KING - - Business Manager.

RATES OF SUBSCRIPTION AND POSTAGE.

Weekly Edition.....\$4·50 a year.
Issued every THURSDAY morning. Contains full Trade Reports for the week, brought up to the close of business on the previous day.

Semi-Monthly Edition.....\$2·30 a year.
Issued the FIRST and THIRD THURSDAY of every month. Contains a full Review of the Trade for the previous half month.

Monthly Edition.....\$1·15 a year.
Issued the FIRST THURSDAY of every month. Contains a full Review of the Trade for the previous month.

To Foreign Countries.

	Postage.	Week.	Semi-Monthly.	Monthly.
Canada	50	\$.50	\$.50	\$ 1·15
Cuba	50	2 50	2 50	1 25
Great Britain	6 00	3 00	3 00	1 52
France	6 00	3 00	3 00	1 52
Germany	6 00	3 00	3 00	1 52
Bavaria	8 16	4 08	4 08	2 04
Peru	8 16	4 08	4 08	2 04
Belgium	6 08	3 04	3 04	1 52
Mexico	8 16	4 08	4 08	2 04
Sweden	5 04	2 52	2 52	1 25
New Zealand	5 04	2 52	2 52	1 25
Brazil	8 16	4 08	4 08	2 04

ADVERTISING.

One square (12 lines, one inch), one insertion, \$2·50; one month, \$7·50; three months, \$15·00; six months, \$35·00; one year, \$40·00; payable in advance.

DAVID WILLIAMS, Publisher,
10 Warren Street, New York.

WESTERN OFFICE.

14 Fifth Avenue, Pittsburgh.
JOS. D. WEEKS, Manager and Associate Editor.

PHILADELPHIA OFFICE.

220 South Fourth Street.
THOS. HOBSON, Manager.

EUROPEAN AGENCY.

CHARLES CHURCHILL & Co., American Merchants, 28 Wilson Street, Finsbury, London, England, will receive all correspondence (not postage prepaid by us) at the following price in sterling: Great Britain, France, Germany, Prussia, Belgium and Sweden, 25. They will also accept orders for advertisements, for which they will give prices on application.

City subscribers will confer a favor upon the Publisher by returning to this office any delinquency on the part of carriers in delivering *The Iron Age*; also, the loss of any papers for which the carriers are responsible. Our carriers will be held responsible for all papers so returned as authorized to receive them, and not to throw them in hallow ways or upon stairs; and it is our desire and intention to enforce this rule in every instance.

CONTENTS.

First Page.—End View of the Exhibit of The Hart, Barker & Mead Mfg. Co., at the Centennial. What's Process for the Utilization of Bessemer and Other Kinds of Scrap Steel.

Third Page.—Civil Engineering at the Centennial. New Bays of Calcium. The English File and Edge Tool Trades. The Officers of Machinery Hall, Centennial Exhibition.

Fifth Page.—American Steel at the Centennial. Seventh Page.—New Patents.

Ninth Page.—Business Items. The Statue of Liberty for New York Harbor.

Eleventh Page.—Foreign Opinions of the United States.

Fourteenth Page.—Some Conditions Affecting the Future of Manufactured Iron. Honest Rails. The Quicksilver Markets. Amalgamation. Steam on the Erie Canal.

Fifteenth Page.—Multiplying One's Hands. New Publications. Principles of the Construction of the Steam Hammer.

Sixteenth Page.—Centennial Notes. The East River Bridge. Cement for Fixing Copper to Iron and Glass.

Seventeenth Page.—Trade Report.

Eighteenth Page.—Trade Report.—(Continued).

Nineteenth Page.—Trade Report.—(Concluded). Our English Letter.

Twenty-first Page.—Our English Letter.—(Concluded).

Twenty-third Page.—The Iron Age Directory.

Twenty-sixth Page.—New York Wholesale Prices of Hardware and Metals.

Twenty-seventh Page.—New York Wholesale Prices.—(Concluded).

Thirty-first Page.—Philadelphia, Buffalo, Cincinnati, Pittsburgh and Detroit Hardware and Metal Prices.

Thirty-third Page.—Chicago, Boston, and St. Louis Hardware and Metal Prices.

Some Conditions Affecting the Future of Manufactured Iron.

The present outlook in the merchant iron trade is about as dismal, in some of its phases, as could well be imagined. It is not so much the prices we refer to, as to the conditions which have made and are making prices. These are such that they augur little that is hopeful in the immediate future, and indicate a demoralization that will be difficult to cure.

The first of these depressing conditions is, to use the words of a prominent iron manufacturer, "competing with 20 cents on the dollar." We have not reached the end of failures in the iron business. There are mills that are sure to go into bankruptcy if the present condition of affairs continues.

In the struggle to keep afloat and to put off the evil day as long as possible, hoping that something will happen to help them, iron is sold without regard to cost, and every ton made is not made for profit, but to raise money at any cost to meet the note due to-morrow. What the iron cost is not the concern of the seller, but what he can get for it. Doubtless this is often done in the honest hope that if this note only is met all will be easy afterward, but we are afraid that in many cases the one who fails would as soon fail for five hundred thousand as for one hundred. Now this is one of the conditions which fixes prices for the mill owner that can and will pay 100 cents on the dollar. True, he need not meet it un-

less he chooses, but if he does not he must shut up his mill, and that oftentimes he cannot do without a loss of which outsiders have but little conception. The expenses for organization, taxes, interest, insurance, watchmen and a thousand and one things go on. He may be getting orders for some specialty that pays, and can afford to run his mill much cheaper than he otherwise could, and the loss of trade through inability to supply orders is an item of no inconsiderable moment.

Another fact that goes far toward making the price of iron, is that a few mills have refused so far to join the efforts that are being made to establish and maintain prices. They remain outside and openly announce their intention to shade established prices. There are not, as one would naturally suppose, strong concerns that can afford to take this stand, but in many cases weak ones. They do not claim that the prices established are any more than the iron should bring, but with a spirit for which it would be difficult to find a name, they desire their rivals to make prices and bind themselves to sustain them, while they remain free to cut those prices just enough to take the orders.

Bad as this is, there is a worse feature still, and that is that manufacturers who have bound themselves to adhere to certain prices will use the most contemptible subterfuges in selling iron, so as to keep the letter of the contract only to break its spirit. Such a policy is anything but manly or honorable.

It is the knowledge of such facts as these that make us despair of any permanent improvement in the iron trade, until those who thus stand in the way of healthy recovery are crowded out of the trade. We cannot see how bank officers with a due regard for the great interests entrusted to them, can grant accommodations to such parties. Probably they would not were they aware of all the facts of the case.

Still another cause of anxiety is found in the present aspect of the labor question. There have been labor troubles before, but never have the conditions been so promising for the success of the unions. They are flushed with victory, even at a time most unpropitious for a strike. With iron down, a weak market and few orders, they made a demand, and got what they asked; and if, under these circumstances, they were successful, now that they have a union of all iron and steel workers, what will be the result of their demands if iron should ever take an upward tendency?

Coupled with their victory, is the humiliation they have put upon the manufacturers in compelling them to sign the contract demanded. The manufacturers have lost an opportunity that will never come to them again, but it is not too late to repair the loss, though the cost will be greater. They too must organize. Narrow and short-sighted selfishness, which almost always characterizes the policy of capital, must, for once, give place to enlightened self-interest. We must have a national federation of employers representing all branches of the iron trade, or we shall have in this country a labor problem quite as serious as that which has steadily undermined the industrial prosperity of Great Britain during the past ten years.

Honest Rails.

Our comments on the organization of an Iron and Steel Rail Inspection Bureau in the West, to purchase rails for the railroad companies, have been very severely criticized by several of the railway journals.

As our information concerning the organization of the Bureau was gained from an extract from the *Railway Review*, that journal takes us to task somewhat sharply for venturing to differ with its expressed opinions on the subject. It is not in accordance with our custom to waste space in discussing questions of opinion with our neighbors, but when our views are misrepresented and our statements discussed without quoting them, it is perhaps due to ourselves to correct any mistakes which may thus arise.

The only point of difference between us and the *Railway Review* seems to have grown out of our very confident and, we think, easily substantiated assertion, that the railroads can get good rails whenever they are willing to contract with responsible makers at fair prices. If this be true, we fail to see the necessity for a Bureau of Inspection to be paid a commission for rendering the companies services they have no need to pay for. Railway managers are not such innocent, confiding people that they need employ some one to protect them against dishonest mill owners. They can get first quality rails in any quantity, with the makers' guaranty, and, if further assurance is needed, they have their own engineers who can make all necessary experimental tests. The *Railway Review* does not seem, however, to

have so good an opinion as this of the intelligence of its constituency. It says:

"As we said before, one trouble in the purchase of rails lies in the fact that many purchasers do not know just what they want. They know little or nothing about the requirements of a good rail, and if they give their order thus ignorantly they place themselves entirely in the hands of the rail makers. It is no easy thing to tell a good rail from a bad one after it is completed. Now if these purchasers choose to avail themselves of the knowledge of a 'Bureau' of experienced, qualified men, who will watch the process of manufacture and see that everything is done right to make a good rail, why should they not do so. One thing is certain, no reliable rolling mill company will think of taking offense at such action. As a matter of fact, many railway companies have men at the mills which make iron for them, to look after their interests. The mill companies like to have it so. Now why should they or any one object to the employment of the experts of a 'Bureau.' From the view of the makers even, this plan has some good points. It shuts off future complaints from the buyers. It is often, indeed usually the case, that when new or old rails are weighed by the mill and by the railway company in different places and on different scales there is a discrepancy. If both parties were represented when the weighing is done at the works this would be avoided. The indignation of *The Iron Age* at the formation of such a Bureau is, therefore, uncalled for and unnecessary.

sumer can get just what he is willing to pay for, and under existing conditions he can get it cheap. If, however, our railroad managers think that they can buy through a Bureau good rails for less than good rails are worth, they will incur the risk of being doubly deceived, if not doubly cheated.

The Quicksilver Markets.

The rapidly increasing quicksilver production of the State of California, and the corresponding decline in the value of the metal, have powerfully contributed to stimulate the production of gold and silver, especially the latter. While quicksilver ranged between 80c. and \$1·38, gold, in California, as was the case from 1871 to 1875, the poorer ores could not be worked to advantage, and but for the extraordinary richness and abundance of ore, both gold and silver, in the Comstock mines of Nevada, dear quicksilver would have meant a decreased output at least of silver. The decline in quicksilver to 40c. and 50c. gold, at San Francisco, this year, has enabled silver mines, even of the poorer class, to push their industry with the utmost vigor, and the year bids fair to prove a most bountiful one in the amount of gold and silver which add to the wealth of the United States.

The production of the Western Slope of the Rocky Mountains for the current year is estimated by competent judges at the following rate per day:

	Silver.	Gold.
Nevada	\$12,000	\$75,000
California	15,000	78,330
Oregon, Arizona, Montana and Idaho	12,000	8,000
Colorado	15,000	10,000
	\$167,000	\$182,330
300 days	\$50,100,000	\$54,699,000

constituting a total output of the precious metals of together some \$105,000,000.

The five leading quicksilver mines of this country produced 39,542 flasks of quicksilver in 1875, as follows:

	Flasks.	Value.
New Almaden	14,000	\$14,000
New Idria	8,000	8,000
Redington	8,000	8,000
Salpum Bank	5,215	5,215
Great Western	3,647	3,647
	29,542	29,542

The following proves to have been the world's production in 1875:

	Flasks.	Value.
California	53,700	\$53,700
Spain	36,000	\$36,000
Idria (Austria)	8,000	8,000
Germany (Palatinat, &c.)	2,400	2,400
Italy	2,700	2,700
Borneo	2,000	2,000
Mexico	900	900
	106,700	106,700

California's production during 10 years:

	Flasks.	Value.
1866	46,590	\$17,171
1867	37,000	18,736
1868	37,000	18,736
1869	33,718	18,744
1870	29,546	18,744
	318,714	65,706

service. The fate of the enterprise shows that we were right. The company's liabilities are about \$100,000. In view of these facts, the suit of Mr. Baxter against the State to recover \$135,000 to which he claims to be entitled on account of his invention, seems to be based upon an assumption which it will be difficult to sustain.

It is now many years since attempts were first made to move the tonnage of the Erie Canal by steam power, and it must be confessed that much of the money expended in experiments has been wasted. Had inventors and their "backers" given the problem intelligent study in all cases, and avoided repeating, over and over again, failures of which accurate and complete records were obtainable, much of this large capital would have been saved. Among other things, it has been clearly shown by experience that screw propulsion cannot be employed with economy on the canal. Eighteen years ago propellers were withdrawn from the canals which rendered better service than have ever since been rendered by any steamers capable of passing the locks. Experience has also shown that it is quite as impossible to apply steam power to each boat as it would be to provide each freight and passenger car on a railroad with independent propelling machinery. If steam is to effect an important economy over horses on the canal, we must so apply it that barges can be towed in trains, with all their capacity, as now, utilized for cargo, and with no expense for power when none is used. Mr. Baxter's experiment was probably made in good faith, and in the belief that he could obtain from one of his engines sufficient power, with so great an economy over the more wasteful engines employed fifteen to twenty years ago as to make twin-screw propulsion practicable. We can only regret, however, that the conditions of success were not more carefully and intelligently studied from the performances of the first two boats, the "Baxter" and "City of New York," so that subsequent unprofitable investments of capital in the same direction might have been avoided.

Multiplying One's Hands.

"I wish I had two pairs of hands" is an expression frequently heard from both the workingman and the manufacturer. It is an expression of the feeling that the production possible with one pair of hands is out of all proportion to the amount of time employed or the amount of energy expended. The mechanic who experiences this feeling knows that too much time is lost in preparations or wasted in trifles, but it does not always, if often, occur to him that it is possible to make his brain supplement his muscles to an extent which shall render his hands more than doubly productive.

We cannot do better by way of illustrating the way in which one's hands may be multiplied, than to tell the story of a "down East" Yankee who built and ran a brass foundry in one of our small Eastern cities. The building he purchased was a small one, consisting of a single room. One corner was cut off by a partition, and part of this space was used for an office, while the remainder formed the engine room and boiler house. Power was supplied by a small portable (oscillating) engine and boiler, the latter set in brick by the owner's hand, and the engine, which was very pretty, mounted on a wooden stand, also his own work. This was the nucleus. A large addition was put up and he moved in, and began the manufacture of his machinery and fixtures. The furnace was his own work, but the chimney was built by a mason. Then came the first step toward multiplying his hands. While melting, it was necessary to regulate the blast by running the engine faster or slower, as the case might be, and to do this it was necessary to step into the next room and give the throttle valve turn or two. This only required a quarter of a minute and a few extra steps, an amount of labor so small that it would not have been noticed by most men; but in the course of a few weeks a line of light wooden shafting was run along one side of the shop, and upon it skeleton pulleys were arranged, so that by using ropes which hung from them the shaft could be revolved. In the engine room the movement of this shaft was arranged to open and shut the throttle. In another week rope belts in various convenient positions enabled him to control the speed of his engine, without the loss of time, from any part of the shop where he might be at work. When at the further side of the molding room, some 70 or 80 feet away, this was decidedly a saving. Bells upon doors, signs to indicate where he was to be found when absent from the front room, telltales to indicate low water alarm and whistle to give warning of an increase of steam pressure beyond the point of safety, and innumerable other simple devices were combined to make it prac-

tically possible for the man to be "in two places at once." The pressure gauge watched the steam, and was ready to call attention at the moment it was needed. The card at the door told the visitor just where the man was to be found, and so in a dozen ways he duplicated his personal attention without expense. To the saving of labor, however, his efforts were chiefly directed.

This report, the main features of which were anticipated in the report of the meetings published in *The Iron Age* of June 18th, is a document which we should be glad to see in the hands of every stove dealer in the United States. We do not suppose that the number printed would admit of any such general distribution, but we should be glad if it were so. The able address of Mr. S. S. Jewett, president, and the calm, intelligent, thoughtful debates of the members cover a wide range and include nearly all topics of interest to the stove trade. It was an exchange of ideas and experiences between the men who make stoves, which would enlighten those who sell them on many points concerning which most of them now have very vague and uncertain notions. From this discussion they would learn a great deal which it would be well for all in the stove trade to know and think about, and we hope that all who have access to the report—both manufacturers and dealers—will read it carefully. We have no doubt, although we are not authorized to say so, that copies can be obtained by addressing the obliging secretary of the Association, Mr. Josiah Jewett, of Jewett & Root, Buffalo, N. Y., until the edition is exhausted.

Principles of the Construction of the Steam Hammer.

BY EDWIN L. WALLACE M. E.

In the course of visits to shops in various parts of the country, the attention of the careful observer is generally drawn to a comparison of the efficiency, design and construction of the various machine tools which come to his notice. Some are models of elegance and lightness, while others designed for the same purpose are exceedingly heavy and clumsy. Within the wide ranges of difference sometimes observed there are certain proportions most suitable to a given case, and to determine these proportions, in order to secure the highest efficiency with the least expense of construction, is one of the most important divisions of the engineering profession.

In the course of the investigations necessary to secure these results, there usually exist, and demand consideration, two classes of stress quite distinct from each other: The 1st, where the stress is static and proceeds from a force applied either gradually or suddenly; and 2d, where the stress is dynamic, and is caused by taking up a certain amount of the mechanical work existing in a moving mass—or in other words, is caused by a blow. The laws of the strains produced by stresses of the first class are well understood, and the proportions necessary to resist them have been many times determined; but the strains produced in a given material by a blow upon it not only are not accurately known, but depend upon conditions very difficult, if not impossible, to introduce into a calculation. Under these circumstances, the last resort is to approximate as near as possible to the strains produced, and then by actual trial test the accuracy of the approximation. There are various methods of approximation, all depending upon a static stress, and the distortions produced thereby; or, as expressed by the principle, the work expended on a material equals, one-half the product of the force applied into the distortion produced.

I am well aware that the application of the principles of mechanics to the construction of machine tools is very generally not made, and the relative proportions are determined entirely by the judgment and experience of the designer. Owing to the difficulty of analyzing strains, it is seldom done, and when machines of new design are to be built, the designer proportions the parts according to his judgment, and when the machine is constructed and in use the parts which give way first are successively strengthened until by repeated experiments a certain degree of uniformity of strength is secured for the whole machine. To be sure, results obtained experimentally are reliable, but experiment is expensive, and the reduction of the expense of construction is an object to be kept always in view. In no machine tool has this method of construction been more closely adhered to than in the steam hammer, and the hammer as it stands to-day is the result—I might almost say the design—of 35 years actual use.

In this paper I shall not attempt to criticize or compare closely hammers already existing, but simply to assume a hammer of standard form and apply to its construction principles which being invariable require but a repetition of the work to apply them to any hammer. The mere fact that the proportions of the hammer have been experimentally determined is no reason why such principles as bear upon it should not be applied. Of course there is no dispute that a hammer proportioned without analysis will work, and will probably satisfy those for whom the fact that "it works well in practice" is a good and sufficient reason for everything, but it cannot realize the finer qualifications of a design.

In proportioning machinery we must, however, remember that it is better to err on the side of strength than on that of weakness, and wherever there arises a doubt to use a sufficiently large factor of safety. Although this may increase the cost of construction, still we thereby secure rigidity, a quality almost, if not quite, as essential as strength itself, and which is to be secured only by massive machinery.

To avoid writing abstractly we will assume a

share falls to every man. It is a good policy to see that the ways of life are well lubricated, and that there is no unnecessary friction.

New Publications.

PROCEEDINGS OF THE FIFTH SEMI-ANNUAL MEETING OF THE NATIONAL ASSOCIATION OF STOVE MANUFACTURERS OF THE UNITED STATES, AT PHILADELPHIA, JUNE 14TH AND 15TH, 1876.

This report, the main features of which were anticipated in the report of the meetings published in *The Iron Age* of June 18th, is a document which we should be glad to see in the hands of every stove dealer in the United States. We do not suppose that the number printed would admit of any such general distribution, but we should be glad if it were so. The able address of Mr. S. S. Jewett, president, and the calm, intelligent, thoughtful debates of the members cover a wide range and include nearly all topics of interest to the stove trade. It was an exchange of ideas and experiences between the men who make stoves, which would enlighten those who sell them on many points concerning which most of them now have very vague and uncertain notions. From this discussion they would learn a great deal which it would be well for all in the stove trade to know and think about, and we hope that all who have access to the report—both manufacturers and dealers—will read it carefully. We have no doubt, although we are not authorized to say so, that copies can be obtained by addressing the obliging secretary of the Association, Mr. Josiah Jewett, of Jewett & Root, Buffalo, N. Y., until the edition is exhausted.

hammer to be worked under given conditions and determine proper proportions, the subject being taken up in detail, and the principles which bear upon the construction of each part severally examined. This method of treating the subject has been selected as the most natural way of applying mechanical principles to mechanical work. The hammer chosen as the type is that known as the Nasmyth hammer, as, in my opinion, this pattern secures for general forging purposes and for large hammers the most advantages with the fewest defects. Accordingly, the details of the pattern will be taken up and treated in the following order: 1, cylinder; 2, valve movement; 3, ram; 4, frames; 5, substructure of frames; 6, anvil block and substratum; 7, anvil block and ram; 8, piston rod; 9, piston; 10, boilers.

The following are the conditions assumed to be fulfilled:

The moving weight weighs 15 tons = 30,000 lbs.

The steam cylinder is 3 ft. in diameter.

The length of stroke is 8 ft.

The hammer is worked at a steam pressure of 60 lbs. per sq. in.

The width between standards is 20 ft., and the height under the frames is 9 ft.

Assume that the friction equals 1 per cent, and the back pressure equals 2 lbs. per sq. in.

CYLINDER.

On the down stroke we have the following conditions:

Area of cylinder..... 1,017 sq. in.

Total pressure of steam..... 61,041 lbs.

Friction = .01 of 30,000..... 300 lbs.

Back pressure..... 2,034 lbs.

Effective steam pressure..... 58,707 lbs. and the total force tending to drive the hammer down = 58,707 × 30,000 = 88,707 lbs.

From the mechanical formula

$$F = M \int_{\text{cut-off}}^{\text{stroke}} p dV = \frac{30,000}{g} f \text{ from which we get the acceleration on the down stroke}$$

$$f = 95 \text{ ft. per sec.}$$

Also the space $s = \frac{1}{2} f^2 \therefore t = \sqrt{\frac{2s}{f}}$ or, the time required for a down stroke,

$$t = \sqrt{\frac{2 \times 8}{95}} = 41 \text{ sec.}$$

Also, $v = ft$, from which we get the velocity at the end of the stroke,

$$v = 95 \times 41 = 397 \text{ ft. per sec.}$$

Also, $v^2 = 2gh$, from which the height due to acquired velocity

$$h = \frac{v^2}{2g} = 23.6 \text{ ft.}$$

The work which the hammer is able to do is equal to the weight of the hammer multiplied by the height due to the velocity, and this equals $\frac{1}{2} M v^2$. The work = $w = h = 15 \times 23.6 = 354$ ft. tons, and this figure represents the maximum amount of work attainable from the blow of the hammer.

On the up stroke we have the following conditions:

The steam pressure on the area of the piston rod must be subtracted from the total steam pressure in order to find the effective steam pressure. The piston rod, as subsequently determined, is 9 inches diameter, hence the area is 63.6 square inches, and subtracting this from the area of the cylinder we have:

Effective steam area..... 954 sq. in.

Total upward steam pressure..... 57,340 lbs.

Back pressure and friction..... 2,334 lbs.

Effective steam pressure..... 54,906 lbs.

Force tending to raise the hammer,

$$54,906 - 30,000 = 24,906 \text{ lbs.}$$

The acceleration on the up stroke, as found from the formula $F = M f$ equals

$$f = 26.7 \text{ ft.}$$

In order to use the steam economically and also to secure the cylinder against being knocked to pieces, it is necessary to cut off on the up stroke and use the steam expansively to drive the hammer the remaining distance.

To investigate the effect of cutting off at different points of the stroke we find the work given out by the expanding steam. The steam in the cylinder expands in an adiabatic curve, the equation of which is

$$p \propto v^{-\frac{1}{n}}$$

Now, the work given out during expansion equals $\int_{\text{cut-off}}^{\text{stroke}} p dV = \int_{l_1}^{l_2} p dV$ where a = the area of the cylinder, l_1 = the length of stroke, and l_2 = the distance traversed before cut off. This added to the work before cut off, gives the total work. If p_1 = the initial pressure and r = the

$\frac{1}{n}$

$p \propto v^{-\frac{1}{n}}$

from which the work given out during expansion equals $a p_1 l_1 r$ hyp. log. $\frac{l_2}{l_1}$ and this equals the work to be taken up, hence

pressure before cut off, added to the work required to lift the hammer through the stroke and the sum subtracted from the work given out by the steam give the amount of work remaining in the hammer at the top of the stroke. The work of compression is found as follows: Let p_1 = pressure above piston at cut-off = 15 lbs.

l_1 = length of cylinder above piston at cut-off.

l_2 = length of cylinder above piston at top of stroke = $\frac{1}{2} l$.

a = area of piston.

The work of compression equals

$$w_c = a \int_{l_1}^{l_2} p dV$$

The compression is treated as against an air cushion, the equation of whose curve of expansion is

$$p \propto v^n$$

By integrating the expression for the work we get

$$w_c = a p c l_1 \text{ hyp. log. } \frac{l_2}{l_1}$$

From the formula for the work given out by the steam, and that for the work taken up by compression, the following table has been constructed:

Point of cut-off.	Value of r .	Point of cut-off.
6 ft.	15	15
6 ft. 6 in.	16	16
7 ft.	17	17
7 ft. 6 in.	18	18
8 ft.	19	19
8 ft. 6 in.	20	20
9 ft.	21	21
9 ft. 6 in.	22	22
10 ft.	23	23
10 ft. 6 in.	24	24
11 ft.	25	25
11 ft. 6 in.	26	26
12 ft.	27	27
12 ft. 6 in.	28	28
13 ft.	29	29
13 ft. 6 in.	30	30
14 ft.	31	31
14 ft. 6 in.	32	32
15 ft.	33	33
15 ft. 6 in.	34	34
16 ft.	35	35
16 ft. 6 in.	36	36
17 ft.	37	37
17 ft. 6 in.	38	38
18 ft.	39	39
18 ft. 6 in.	40	40
19 ft.	41	41
19 ft. 6 in.	42	42
20 ft.	43	43
20 ft. 6 in.	44	44
21 ft.	45	45
21 ft. 6 in.	46	46
22 ft.	47	47
22 ft. 6 in.	48	48

August 17, 1876.

Centennial Notes.

BIEHLE BROS.,

Philadelphia. This firm, proprietors of the well known Philadelphia Scale and Testing Machine Works, have a very interesting display in Machinery Hall, section E. S., columns 54 and 55. The exhibit is large and varied, and deservedly attracts a good deal of attention. We can only refer to a few of the exhibits, and will first name an 80,000 lb. railroad track scale, with patent double beam for weighing loaded cars. This scale appears to have been planned so as to combine strength with accuracy of record. The one on exhibition is only 30 feet long, but can be lengthened to almost any size by adding more sections of levers. By this means railroad companies and others are often saved considerable expense, as it can be adapted to any change in the length of cars (or other causes requiring increased length) with very little additional expense. Another feature in this scale is the rocking bearings, causing the entire scale to have a free, easy motion; the fulcrums being longer than is generally used, the sensitiveness of the scale is retained for a much longer period. The patented double beam has an ingenious balance ball that will not turn unless moved by the hand, being propelled back and forth by a wheel, thus preventing it getting out of balance, as the old style are liable to, without the knowledge of the weighmaster. Among their testing apparatus they have a 75 ton testing machine to test metals by tensile and crushing powers, and being a very complete machine it appears to attract considerable attention. Tests of iron, leather belting, &c., are made daily, so that it can be seen in practical operation, and enable interested parties to decide upon its claims to merit. A machine of 200 lbs. capacity for testing samples of cement, and one of 100 lbs. capacity for testing fine wire, twine, &c., can also be seen in operation. They also exhibit furnace charging scales, the motionless platform, coal, hay and cattle scales, depot and rolling mill and portable platform scales, parallel crane beam, &c., all of which appear to be of excellent quality, and highly creditable to the exhibitors and to the manufacturing interests of the city of Philadelphia.

THE HULL & BELDEN CO.,

Danbury, Conn., have their exhibit of wrought iron and steel drop forgings in Machinery Hall, Section C, Column 72. In this display may be seen in great variety specimens of all the leading articles manufactured by them, among which we may mention the "Climax" pipe wrench (described in *The Iron Age*, July 27th), which is made of best tool steel, and forged solid from the bar; wrench bars, which are drawn from bar iron, and headed by an improved process, preserving the original grain of the iron whole length; specimens of carriage and wagon hardware, pistol barrels, breech pieces for breech loading double gun, gunhammers, gun triggers, spinning rings, solid cast steel shears, clamp screws, thumb screws, drill chuck jaw, machine handle, machine binder screws, bolt and screw forgings, &c., and a variety of articles useful to gas fitters and machinists generally. In Annex No. 1, of Machinery Hall, the company have in operation the dead stroke power hammer, where its peculiar features can be examined, and the advantages claimed for it by the makers fully tested. It has been patented in this and several European countries, and we are informed was awarded a prize medal at the Paris Exposition. The special advantages claimed for this hammer, are as follows: "They can be run at high speed without breaking themselves to pieces. They have neither cylinders, valves nor piston rods, consequently repairs are trifling. They take up much less space, require much less power to drive, strike much harder and truer blows than either trip or tilt hammers of double the weight of ram. They can be worked to strike good alternate blows on a three-inch and three-eighths inch bar when a 100 lb. hammer is used. They can be used on die work to a far greater advantage than any other hammer known. They are set compacts and ready to work as soon as secured in foundation, and can be run with a belt, at almost any angle." The display is a very useful and practical one throughout, and deserves a careful examination by every one who visits Machinery Hall.

THE AMERICAN MACHINE COMPANY.

In the Annex to the Main Building the American Machine Company have a very elegant display of fluting and wringing machines, which attract general attention from the trade and housekeepers generally. The Crown wringers and fluters were fully described in *The Iron Age* of July 27th, and we will, therefore, only refer to the Star fluting machine, which is said to be the latest and most novel improvement upon all the old styles of machine, having all the advantages of the latter, with special features of great practical convenience peculiar to itself. Foremost among these is the position of the rolls, which, in this machine, are entirely free from all surrounding obstructions, thus giving the operator the best opportunity of putting in and guiding the work with ease and regularity, and exposing it to full view immediately after it has passed through the rolls. It removes the objections heretofore urged against machines with overhanging rolls, as the lower roll is in the "Star" is firmly supported in bearings at both ends, and the upper roll can readily be adjusted to the lower one in case of wear. The base of this machine has a clamp screw attached, by means of which it is fastened to the table. The arrangement of the pressure spring is such that the separating of the rolls does not compress it, thus not only saving the spring unnecessary strain, but easing the operation and saving the ruffle, which in other machines often becomes injured by the sudden clashing together of the rolls when released from the hold of the catch. The machines, in

every part, are of the best material and workmanship, finished in beautiful style, and present an elegant appearance. A pair of malleable iron tongs and a set of four wrought iron beaters is furnished with every machine. The rolls are made with 10, 12, 15, 18, 22, 26 and 30 flutes.

The East River Bridge.

The first cable was stretched between the New York and Brooklyn towers of the East River Bridge on Monday. The work was begun at nine o'clock. The cable had been laid over the Brooklyn tower, and the large drum, on which was wound the wire, was on a scow. The steam tugs Ed. Annan and May Clinton were made fast to the scow, and at half past nine these were started across the river. The wire rope was slowly paid out, sinking to the bottom of the river, and within nine minutes was taken to the New York side. A large rope was then dropped from the tower and made fast to the cable, the other end being wound around the drum of a fifteen horse-power hoisting engine on the wharf. A cannon was fired as a signal for vessels not to cross the line during the raising of the cables. More than 5000 persons watched the raising of the cable. The lighter Comet was the first vessel that passed under the wire, and it was greeted vociferously. The stringing of the preliminary rope is the way by which all the wires that go to make up the great cable will be carried over the tower. Another rope was stretched across between the towers before the day's work was done. Both ropes were spliced together and were run from the drums at each anchorage, thus forming an endless rope. This rope will bear a strain of 14½ tons. Attached to it, at distances of about forty-five feet, there will be pulleys with hooks fastened beneath. The carrier rope is 1½ inches in diameter. Through the hooks a rope 1½ inches in diameter is to be carried. The end will be fastened to the working rope, and thus it will be dragged over the towers and across the river to the anchorage on the New York side, where it is to be made fast.

In all there will be ten temporary cables put up. Four of these are to be 2½ inches in diameter, and these are to support the cradles. There is to be a foot bridge forty-eight feet long and four wide, with a hand rail about four feet high, all made of stout oak, and bolted together. That will be called a cradle. At both ends there are to be two posts connected by pieces at the top which will support pulleys for the carrying of the wire for the great cables.

At 9:30 the bells of the tug sounded to start, the lashings were cast off, and the tug and scow slowly swam around. Mr. E. F. Farrington, the master mechanic, took charge of the stern of the boat, while Mr. G. W. McNulty, of the Engineer Corps, superintended the three men who unrolled the rope. With a lever and a fulcrum on the top, a rope was secured on the rim of the drum, and in this way its action was kept under perfect control. The tide was running out, and as the boat pulled out into the river the current carried them down the stream. In the channel the water is about 65 feet deep. At the Brooklyn tower it is 17 feet, and at the New York tower it is about 35 feet. When two-thirds of the way across the boats were forced to come to a standstill, to allow the English bark August Leffler to pass up the river. At 9:38 the bulkhead of the New York tower was reached, and about 1470 feet of the cable had been paid out into the river. The next thing was to get the cable over the New York tower. A rope was passed from the hoisting engine in the yard over the tower, and it hung on the outer face at the lower end of the great pile of masonry. It was made fast to the wire cable. Mr. Farrington climbed to the top of the tower, and signalled "All ready; go ahead," and the hoisting engine was started. As the wire left the wharf, a cannon was fired. Within five minutes the end of the wire was at the top of the tower, and within five minutes more the slack of the cable had been hoisted in and reeled on the big drum in the yard. There was a long delay about the raising of the cable from the water, because of the many passing vessels. At 11:35 the gun was again fired, and several thousand persons on the piers and ships saw the cable rise from the water and link New York with Brooklyn. Later the ends were taken to the New York anchorage, and the last section was in position. There was great cheering, and many thousands of a few minutes afterward wonderingly gazed upon the wires.

It may be of interest to our readers to know that the contract for all the steel work of the bridge is held by the Chrome Steel Company, of Brooklyn, and that the cables are made by the Roeblings, at Trenton, as sub-contractors, from Chrome steel.

Mr. Thomas Douglass, superintendent of the work has been ill for some time. He repeatedly said that he would contentedly die were he permitted to see the stretching across of the first wire. While Assistant Engineers Farrington and Martin were on the tower, and when the wire had been put in position, they received a telegram saying that Mr. Douglass had just died.

Cement for Fixing Copper to Iron and Glass.—A good cement for fixing copper to iron or glass is got by melting carpenter's glue in wine vinegar, adding a little Venice turpentine, and boiling up for half a day over a slow fire.

Special Notices.

Office of POPE, WILLIAMS & CO.,
CHATEAUGAY LAKE, May 1st, 1876.
We have placed the exclusive sale of our
CHATEAUGAY STEEL IRON
in the hands of Messrs. Naylor & Co., 99 John St.,
New York; 208 South 4th St., Philadelphia; 6 Oliver
St., Boston, who will hereafter act as our agents,
and to whom all orders should be addressed.

Yours truly, POPE, WILLIAMS & CO.

On the 25th of June, 1876, I will receive after August 14th, other
specimens of American Iron and Steel for
this year. For particulars, blanks, etc., address "General Super-
intendent American Institute, New York."

Special Notices.

Hardware at Auction.

BISELL, WELLES & MILLET,

Will hold at their Salesrooms,

No. 15 Murray Street, N. Y.,

THEIR FIRST FALL

TRADE SALE

OF Hardware, Cutlery, Guns, French

Tinned Ware, &c., &c.

ON TUESDAY AND WEDNESDAY,

the 29th and 30th of August,

COMMENCING AT 10 A.M.

This sale will embrace about 1800 lots of desirable
goods of the usual variety, suitable for city and
country trade, consisting of Shelf and Heavy Hard-
ware, 500 dozen Shovels and Spades, a large line of
Cutlery, and a full assortment of French Tinned
Ware. This is a very desirable way of replenishing
stocks from first hands, and we cordially invite our
friends to attend the sale.

BISELL, WELLES & MILLET,

Auctioneers,

15 Murray Street, N. Y.

Notice to Manufacturers
of Cast Iron Water Pipe.

Sealed proposals will be received at the office of the Board of Water Commissioners, No. 97 Washington Street, Hoboken, New Jersey, until 8 o'clock P. M., Thursday, August 31st, 1876, for furnishing the following Cast Iron Water Pipes: Two thousand and five hundred (2500) feet of sixteen (16) inch; five thousand (5000) feet of twelve (12) inch.

Five thousand (5000) feet of six (6) inch, and the necessary branches and bends. To be made of a good quality of iron, the pipes to be cast vertically, bell end down. Tested and inspected under a hydraulic pressure of three hundred (300) pounds to the square inch. To be free from defects of all descriptions.

To be coated with tar while hot inside and out. The pipes to weigh on an average as follows: The sixteen inch one hundred and twenty-five (125) pounds to the lineal foot.

The twelve inch seventy-five (75) pounds to the lineal foot, and the six inch thirty (30) pounds to the lineal foot.

Proposals to be sealed and indorsed. "Proposals for furnishing Cast Iron Water Pipe," and directed to the Board of Water Commissioners of the City of Hoboken.

The Board reserve the right to reject any or all bids if deemed for the interest of city so to do. By order of the Board of Water Commissioners.

M. H. MURPHY,
Registrar.SECOND-HAND
MACHINERY.

AT EXTREMELY LOW PRICES.

One 3000 lbs. Ferris & Miller Steam Hammer, one
ton 100 lbs. Bissell & Miller Steam Hammer, one
ton 100 lbs. Bissell & Miller Gas Furnace, with
Boiler attached, connected with 3000 lbs. Hammer. Eight round heat Hesting Furnaces for anthracite coal. Twelve round open Hearth
Forces for iron. Eleven wrought iron Anvils, each
weighing 200 lbs. and over. One Oliver with
Two Hammers. One Bement 4-inch Bolt Cutter.
Two 2-spindle Bolt Cutters, cut ¾ in. to 1½ in.
One Die Dressing Machine. Two Double
No. 2 Tapping Machines. One Round Nut Tap-
ping Machine, 9 spindle. One Single-spindle
Bolt Cutter, cuts ¾ in. to 1½ in. bolts. One Punching
Machine, punches ½ in. hole through 3-16 in.
iron. One Punching Machine, punches ½ in.
hole through 1½ in. iron. One Punching Machine,
punches 13-16 in. hole through ½ in. iron.
One Plate Shears, receives blades 3 in. long,
and will shear ¾ in. iron. One Alligator Shear, cuts to
1½ in. rod. Two Circular Planers. One Circular
Drilling Machine with 3 spindles adjustable. One
Link Boring Machine, bed 48 ft. long, with 2 heads
One Hardway Bolt Heading Machine, heads ¾ in.
to ¾ in. in. bolts. One Bolt Heading Machine, heads
¾ in. to ¾ in. in. bolts. One Rivet Heading Machine,
heads ¾ in. to ¾ in. in. bolts.

GEORGE PLACE,
121 Chambers & 103 Beale Streets, N. Y.

NOTICE.

Water Filters.

BATTERSEA, LONDON, July 1, 1876.

We beg to advise the trade and public that we have a pointed Mr. H. R. MUNNING, 69 Water St., N. Y., sole agent for the sale of our well known
SILICATED CARBON WATER FILTERS.
SILICATED CARBON FILTER COMPANY.

SPECIAL NOTICE.

Having established ourselves in business in this
city for the sale ofAMERICAN HARDWARE, HOUSE
FURNISHING GOODS, AGRICUL-
TURAL IMPLEMENTS, Etc.,we beg to solicit correspondence with parties desirous
of being represented by us in Germany and sur-
rounding countries.

HAMMACHER & DELIUS.

HAMBURG, Germany, April, 1876.

House in N. Y., A. HAMMACHER & CO., 209 Bowery.

SPECIAL NOTICE

A new style of

MEN'S SINGLE GUNS.

In addition to the former line of A. Simon's, Liege,
now offered.

SILEXIS SHEET ZINC,

Imported by

LOUIS WINDMULLER & ROELKER,
90 Beale Street, N. Y.TO INVENTORS
AND MANUFACTURERS.The 4th Exhibition of the American Institute will open Sep-
tember 1st. Invitations will be received after August 14th, other
specimens of American Iron and Steel for
this year. For particulars, blanks, etc., address "General Super-
intendent American Institute, New York."Specialties of Wrought, Cast, or Sheet
Iron or Brass,Made to order in a SUPERIOR MANNER, AT LOW
PRICES, by the

CORRUGATED METAL CO., East Berlin, Conn.

DISCOUNT SCREW LIST.

Revised to date.....

Cast Hinges and Butts.....

Cast Hinges and Butts.....

Bolts.....

Bolts.....

Dayton & Lamberson, 97 Chambers St., N. Y.

VENTILATING & STEAM HEATING.

A thoroughly competent engineer, with extensive
experience in the above line, desires employment.

Address

M.,

Office of The Iron Age, 10 Warren St., N. Y.

Special Notices.

Special Notices.

ROOFS.

Save time and money by sending for estimate for
new or old buildings. Send for our **100 page Book**
(free if you write to-day), and learn how to stop
leaks effectively and cheaply, save re-shingling, etc.
Correspondence invited. 8 Cedar St., N. Y., or 49
S. Front St., Phila. Mention *The Iron Age*.

JUST ISSUED.

EVERYTHING

FOR THE

FARM.

A. B. COHU,
197 Water St., N. Y.

MANUFACTURING

BY CONTRACT.

Our facilities are unusually extensive and complete
for manufacturing small articles in

Special Hardware, Tools & Machinery.

Are prepared to fill orders promptly and at low
prices. Our reference is our work.

THE HULL & BELDEN CO.,

Danbury, Conn.

WANTED.—A first-class business man familiar
with machinery and manufacturing, capable of handling large bodies of men, desire a responsible
position. References satisfactory. Address,IRON AND STEEL,
Care of P. O. Box 813, Bridgeport, Conn.HALF & HARBOURSON,
Manufacturers ofChemical & Physical Instruments,
191 Greenwich Street, N. Y.SPECIALTY.—BUNSEN'S GAS BURNERS, for all heating
purposes; BUNSEN'S IMPROVED GAS COMBUSTION
FURNACES, with 10, 15 and 25 burners. Fine Brass and
Metal Work made to order for Metallurgists, Chemists,
Experimenters, Colleges, &c.

Trade Report.

Office of THE IRON AGE,

WEDNESDAY EVENING, August 16, 1876.

The past week has witnessed a noticeable improvement in the aspect of general trade, and in some of the principal markets a much better tone is reported. In the financial markets a more healthy tone is apparent. Money is very abundant and extremely cheap. Call loans, with government bonds as collateral, have been negotiated as low as $\frac{1}{2}$ @ 1 per cent, while the rate on stock collateral has been 1 @ $\frac{1}{4}$ per cent. The discount rate on prime mercantile paper has been 3 @ 4 per cent.

The gold market has been very steady, and the fluctuations of the premium have been within very narrow limits. Everything is favorable to a low rate of premium, and speculation is based upon the assumption that it will still further decline. The following shows the extreme daily range of the premium since our last report:

	Highest.	Lowest.
Thursday.	11 1/2	11 1/2
Friday.	11 1/2	11 1/2
Saturday.	11 1/2	11 1/2
Monday.	11 1/2	11 1/2
Tuesday.	11 1/2	11 1/2
Wednesday.	11 1/2	11 1/2

Since last week the price of silver in London has advanced to 53½d. per ounce. This makes the value of the trade dollar 91½c., gold, and of the subsidiary silver coinage 84c., gold. The adjournment of Congress without any action on the Bland silver bill is a great relief to the business community.

Government bonds have been strong but dull. The Secretary of the Treasury at noon on Saturday opened bids for the \$2,160,000 new five percent bonds, sold to obtain the means whereby to discharge judgments of the Alabama Claims Commission. The total amount bid for was \$21,440,000, and the highest bid was that filed by Messrs. Fish & Hatch—105 05, for the whole \$2,160,000; this price is equivalent to 117½ in our market. We give below the closing quotations of governments. State bonds have been strong and steady; railway mortgages strong.

The stock market has been strong with higher prices, except for anthracite coal shares, which have been weak and feverish. The principal dealings have been in Lake Shore, Michigan Central, N. J. Central, Western Union, D. L. and W., St. Paul and Rock Island. The closing quotations of active shares are given below.

The following is a comparison of the bank averages for the past two weeks:

Aug. 5	Aug. 12	Differences
Loans... \$25,756,300	\$25,075,800	Inc. \$319,500
Specie... 20,126,000	21,092,000	Inc. 966,000
Legal tend... 60,333,300	58,683,300	Dec. 1,650,100
Deposits... 226,479,800	226,515,100	Inc. 266,300
Circulation... 15,007,600		

The following tables show the movements in foreign trade for the week:

IMPORTS.

For the week ended Aug. 12.

	1874.	1875.	1876.
Total for week... \$5,252,885	\$8,843,937	\$5,760,715	
Prev. reported... 253,933,436	911,700,833	179,753,902	

Since Jan. 1... \$258,646,962

\$320,544,770

\$185,514,617

Among the imports of general merchandise were articles valued as follows:

Quant.	Value
Brass goods...	.11 1,864
Bronzes...	.17 3,556
Chains and anchors...	.11 284
Copper...	224
Catery...	.78 33,384
Guns...	.14 1,790
Hardware...	.10 1,701
Iron goods...	.11 41,178
Iron, cotton ties...	.16 1,178
Iron, other, tons...	.89 5,583
Iron ore, tons...	.218 2,404
Lead, pigs...	.410 11,879
Lead ashes...	.115 3,812
Metal goods...	.165 20,196
Needles...	.8 5,667
Old metal...	.188
Pewterware...	.1 3,588
Pew. caps...	.26 1,064
Saddlery...	.5 1,064
Steel...	.97 12,109
Specter...	.100,300 5,610
Tin, boxes...	.17,996 114,348
Tin, 364 slab...	.246,440 42,605
Wire...	.28 1,859
Zinc...	.7,700 531

EXPORTS EXCLUSIVE OF SPECIE.

For the week ended Aug. 15:

	1874.	1875.	1876.
Total for week... \$5,496,733	\$4,740,189	\$4,519,541	
Prev. reported... 151,114,273	153,496,650	160,089,851	
Since Jan. 1... \$186,611,102	\$153,235,789	\$164,609,192	

EXPORTS OF SPECIE.

For the week ended Aug. 12:

	\$178,926
Previously reported...	2,669,975

Government bonds at the close were firm, with quotations as follows:

Bid.	Asked.
U. S. Currency 6%	126 1/2
U. S. 64 1881, reg...	119 1/2 119 1/2
U. S. 64 1881, cou...	120 1/2 120 1/2
U. S. 5-30 1885, reg...	116 1/2 115 1/2
U. S. 5-30 1885, cou...	115 1/2 115 1/2
U. S. 5-30 1885, new reg...	117 1/2 117 1/2
U. S. 5-30 1885, cou...	117 1/2 117 1/2
U. S. 5-30 1885, cou...	117 1/2 117 1/2
U. S. 5-30 1885, cou...	117 1/2 117 1/2
U. S. 5-30 1885, cou...	121 1/2 121 1/2
U. S. 10-40 reg...	116 1/2 116 1/2
U. S. 10-40 cou...	119 1/2 119 1/2
U. S. 5-58 1881, reg...	117 1/2 117 1/2
U. S. 5-58 1881, cou...	117 1/2 117 1/2

The closing quotations of active shares were as follows:

Bid.	Asked.
Atlantic & Pacific R. R. Preferred...	2 1/2
Chicago & North Western...	17 1/2 18
Chicago, Rock Island & Pacific...	39 39 39 1/2
Chicago, Milwaukee, St. Paul & S...	107 107 107 107
Chi., Mich. & Ind. Cent...	130 131 131 131
Clev. Col., Cin., and Indpls...	43 43 43 43
Cleveland and Pittsburgh...	92 92 92 92
Chicago & Alton...	102 103 103 103
Chicago and Alton Preferred...	108 108 108 108
Consolidation Coal...	40 41 41 41
Canton...	30 35 35 35
Del. Lack. & Western...	95 95 95 95
Delaware & Hudson Canal...	91 92 92 92
American Express...	114 114 114 114
United States Express...	60 61 61 61
Wells, Fargo & Co. Express...	66 67 67 67
Scovil Manufacturing Co.'s	84 85 85 85

Erie	14 1/2	14 1/2
Harlem	13 1/2	13 1/2
Hannibal & St. Joseph	12 1/2	12 1/2
Illinoia Central	88 1/2	88 1/2
Kansas Pacific	5	7 1/2
Kansas & Texas	8 1/2	8 1/2
Lake Shore	54 1/2	54 1/2
Michigan Central	49 1/2	49 1/2
Morris & Essex	96 1/2	97 1/2
Milwaukee & St. Paul	37 1/2	37 1/2
Mariposa	70 1/2	70 1/2
Pref.	8	10
New York Central	106 1/2	107
New Jersey Central	62 1/2	62 1/2
New Jersey Southern	3 1/2	3 1/2
Ohio Mississippi	13 1/2	13 1/2
Pacific Mail...	24 1/2	24 1/2
Pittsburgh & Fort Wayne	127 1/2	128 1/2
Pacific of Missouri	102 1/2	102 1/2
Quicksilver	11 1/2	13 1/2
St. L. Kan. City Northern	6 1/2	6 1/2
Pref.	30 1/2	31 1/2
Tol., Wabash & Western	1 1/2	1 1/2
Union Pacific	64	64 1/2
Western Union Telegraph	72	72 1/2

der date of 1st instant. The prices quoted are the figures at which these goods are held in this city.

CIRCULAR AND PRICE LIST, NO. 4.

RHODE ISLAND HORSESHOE CO.

PROVIDENCE, R. I., Aug. 1, 1876.

TO THE TRADE.—We take great pleasure in again offering you the several brands of Horse and Mule Shoes manufactured by us. The rapidly increasing demand from all sections of the country for these goods is a sufficient guarantee of the many superior qualities they possess. Thanking you for your patronage in the past, we hope, by strict attention both to the details of manufacture and to the wants of the trade, to merit a continuance of your favors. We are prepared to receive orders for our Horse and Mule Shoes upon the following prices and terms:

Burden's Horseshoes.

Burden's Horseshoes, .43c. per lb.

" Mule " .4c. per lb. extra.

All goods at risk of purchaser after shipment.

We pay no exchange.

Belcher Brothers & Co., No. 80 Chambers

ably in excess of 600,000 barrels. There are now two combinations of refiners, the "Standard" and the "Conduit," and nearly all our refiners are connected with the one or the other of these combinations. Not only are our refiners busy, but they are making money, which is more than can be said about many other branches of business.

NEW RAILROADS—A meeting was held at the Chamber of Commerce yesterday, for the purpose of taking some action toward getting an outlet by rail independent of the Pennsylvania Railroad. The "Pittsburgh and Erie" and the "Northwestern" are before the public for help, and it is more than likely that aid will be granted to the one or the other, but not to both.

BOSTON.

AUG. 12.—*Pig* is very dull, but, if anything, a trifle firmer. Even the largest and most economical furnaces are beginning to give way, the two furnaces that are still in blast out of the Crane's six, for instance, intending to blow out immediately. All of the Allentown furnaces are out. With common labor at the furnaces reduced from \$1.25 to 75c. per day, and skilled hands proportionately, there certainly seems little margin for further reduction in labor, the only hope now being in cheaper coal. We quote No. 1 at \$25; No. 2 at \$23, and Gray Forge at \$20, though there is much irregularity of prices in the last named grade. *Bar* is dull and flat. A fair range would be from \$48 to \$54. Common Iron quotes from \$42 to \$46. *Steel* has a small business at steady and unchanged prices. We quote: American Tool, 14c.; American Crucible, 8½c.; Sweet's Excelsior Tire, 7½c.; English Tool, 15½c., gold. Copper is weak and lower to sell, all confidence having entirely oozed out of buyers since the recent maneuvering of holders. Ingots may be quoted at 19c., to 20c. For manufactured we quote: New Sheathing, 3½c.; Bolts and Braziers, 32c.; Yellow Metal Bolts, 26c.; do. Sheathing, 21c. Lead is quiet and firm, without pressure of holders or eagerness of buyers. We quote: Pig, 7½c. for Domestic; Sheet, 10c.; Pipe, 9½c., currency; Tin Lined Pipe, 16c.; Bar Lead, 9½c., less usual trade or 10 per cent discount. *Antimony* quotes nominally at 16c., gold, for Boston spot lots. *Solder* is listless and easy at 7½c. to 7¾c. *Tin* holds steady with a small business. We quote: Straits, 17½c. to 17¾c.; Banca, 21½c. to 21¾c.; Refined English, 17½c., gold. We quote Plates: Charcoal I., C., \$750; Coke, \$6.25 to \$7.00; and Terne at \$7.50 to \$8, gold.—*Commercial Bulletin*.

ST. LOUIS.

Messrs. SPOONER & COLLINS, Iron commission agents, 409 North Third street, St. Louis, under date of Aug. 11, report the iron market as follows: Our market remains about the same as last reported. The demand for iron, however, seems to be on the increase, and we look for better days soon. We quote same as last:

No. Stone Coal, No. 1 F'dry	\$35.00 @ 26/00-4 mos.
" No. 2 F'dry	\$22.00 @ 24/00-4 mos.
" " Gray Mill.	\$22.00 @ 23/00-4 mos.
" " Charcoal, No. 1 F'dry	\$22.00 @ 24/00-4 mos.
" " " Gray Mill	\$22.00 @ 23/00-4 mos.
Tenn. Charcoal Bar	\$22.00 @ 22/00-4 mos.
" " " No. 2 F'dry	\$22.00 @ 22/00-4 mos.
" " " Gray Mill	\$21.00 @ 22/00-4 mos.
Tenn. & H. R. Coke Iron No. 1 F'dry	\$25.00 @ 26/00-4 mos.
Tenn. & H. R. Coke Iron No. 2 F'dry	\$23.00 @ 24/00-4 mos.
Mo. Charcoal Hammered	\$22.00 @ 23/00-4 mos.
Billets	75.00 @ 80/00-4 mos.
All round Bar	75.00 @ 80/00-4 mos.
No. 1 Wrought Scrap	90.00 @ 2½ rates.
Heavy Cast	65.00 @
Light Cast	45.00 @

CINCINNATI.

Messrs. L. R. HULL & CO., under date of Aug. 12, write us as follows: *Pig Iron*.—To furnish a weekly review of the *Pig Iron* market, and yet avoid a monotonous repetition of previous noted facts, is a puzzling undertaking while so few interesting changes occur or indications are discernible indicative of their approach. About the usual amount of business for this period has been transacted in Foundry and Mill Irons, the average demand from week to week being without noticeable variations either way, and continuing in a quiet subdued but regular manner, similar to what we have had for many months. The *Alice* Iron Works have been holding the "Alice" brand at firm figures since the beginning of the present blast, and prefer to allow sales to pass rather than make concessions in price. This policy is generally followed by the furnaces, and buyers seldom "bear" the market as they did when there was less confidence of its having touched bottom, or when their purchases were sufficiently large at any one time to make it more of an object. On the whole, matters are as satisfactory as can be expected in the present condition of trade throughout the country, and iron-masters appear as patient as circumstances will permit. Our prices below remain unchanged:

CHAMOIS.	
Hanging Rock No. 1. 1/2 ton.	\$22.50 @ 24/00-4 mos.
" No. 2.	\$22.00 @ 23/00-4 mos.
" Forge	\$21.00 @ 21/50-4 mos.
Southern Brads No. 1.	\$23.00 @ -4 mos.
" Forge	\$20.50 @ 21/00-4 mos.
Virginia No. 1.	\$23.00 @ -4 mos.
" No. 2.	\$21.50 @ 22/00-4 mos.
" Forge	\$21.00 @ -4 mos.

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of Aug. 14th: The iron market remains as dull as ever; demand light and prices unchanged:

Virginia cold blast Charcoal Pig Irons (according to brand).	\$28.00 @ 35/00
Virginia hot blast Charcoal Pig Irons (according to brand).	24.00 @ 28/00
Va. hot blast Coke Pig Iron, No. 1 ex.	24.00 @ 25/00
" " " No. 2 ex.	22.00 @ 22/00
" " " No. 3 ex.	20.00 @ 21/00
White and Mottled	17.00 @ 19/00

FOREIGN.

FRANCE. (*Monteur des Industries*.)

PARIS, July 30, 1876.—**Metalas.**—But for the extraordinary abundance which the cereal and other crops of Europe promise this year, the outlook in the Metal markets would be anything but a reassuring one. Both dealers and consumers proceed with the utmost caution, not to say with timidity, in replenishing stocks. The quantities which they hold are, nevertheless, conceded by themselves to be moderate, and it will not require much to bring about a general revival in business. Holders are fully aware of this, and offer sparingly, except in cases where pressing financial necessities oblige them to deviate from this policy. The abundance of money enables the bulk of holders to prevent a further precipitate decline. At the same time, the auxiliary element of strength which speculation constitutes in ordinary times is either crippled or trifled away. The market is now in a state of suspense, for some time to come, until a general revival in business is placed beyond a doubt.

COPPER.

No. 1 Foundry extra..... \$20.00 @ 21/00

" 1 Foundry..... 19.00 @ 20/00

" 2 Foundry..... 18.00 @ 19/00

" 1 and 2 Forge..... 14.00 @ 15/00

White and Mottled..... 13.50 @ 14/00

NOT BLAST CHARCOAL.

No. 1 Foundry, extra..... \$20.00 @ 21/00

" 2 Foundry..... 18.00 @ 19/00

" 3 Foundry..... 15.00 @ 16/00

White and Mottled..... 14.50 @

COLD BLAST CHARCOAL.

Car Wheel Iron..... \$22.00 @ 27/00

Forge Metal..... 17.00 @ 14/00

Cast Scrap, Heavy..... per ton. 12.00 @ 14/00

Old Car Wheels..... " 8.00 @ 14/00

Old Rails..... " 17.50 @

No. 1 Wrought Scrap..... per lb. 3c. @

No. 2 Wrought Scrap..... " 3c. @

CLEVELAND.

Messrs. C. E. BINGHAM & CO., 25 West Main street, report the date of Aug. 14, quote the iron market as follows, 4 mos. time:

FOUNDRY IRON.

No. 1 Lake Superior Charcoal..... \$27.00-4 m.

No. 2 " " " 26.00-4 m.

No. 1 Anthracite..... 25.00-4 m.

No. 2 " " " 23.00-4 m.

No. 1 Bituminous..... 25.00-4 m.

No. 2 " " " 23.00-4 m.

No. 1 Cherry Valley Am. Scotch..... 27.00-4 m.

B-1 " " " 26.00-4 m.

No. 2 " " " 24.00-4 m.

No. 1 Massillon..... 26.00-4 m.

B-1 " " " 24.00-4 m.

No. 2 " " " 22.00-4 m.

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal..... \$27.00-4 m.

No. 4 " " " 27.50-4 m.

Nos. 5 & 6 " " " 27.00-4 m.

BESEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal..... \$27.00-4 m.

FORCE IRON.

No. 1 Gray..... \$22.00-4 m.

White and Mottled..... 20.00-4 m.

LOUISVILLE.

Messrs. GEO. H. HULL & CO., under date of Aug. 15, write us as follows: There is a better feeling in Iron, and sales are more frequent. There is not so much disposition to press sales, and several brands that have changed hands at very low prices, on account of forced sales, are now held higher, and are selling at the advance. On other brands there has been no change in prices. We make a partial revision of figures, based on actual sales, as follows. The usual time, 4 mos., is allowed on quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores..... \$22.00 @ 25/00

" 2 " " " 22.00 @ 23/00

1 Mill, " " " 20.00 @ 21/00

1 F'dry, from Alabama, Georgia and Tennessee Ores..... 22.00 @ 23/00

2 F'dry, from Alabama, Georgia and Tennessee Ores..... 21.00 @ 22/00

1 F'dry, from Missouri Ores..... 20.00 @ 21/00

COLD BLAST STONE COAL AND COKE.

No. 1 F'dry, from Hanging Rock Ores..... \$22.00 @ 23/00

" 2 " " " 21.00 @ 22/00

1 Mill, " " " 20.00 @ 21/00

1 F'dry, from Alabama, Georgia and Tennessee Ores..... 22.00 @ 23/00

2 F'dry, from Alabama, Georgia and Tennessee Ores..... 20.00 @ 21/00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores..... \$25.00 @ 45/00

" Tennessee Ores..... 22.00 @ 30/00

" Alabama and Georgia Ores..... 28.00 @ 40/00

Car Wheel from Kentucky Ores..... 28.00 @ 45/00

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, 46 and 48 South Charles street, report us the following prices under date of Aug. 15: The usual midsummer apathy in trade has continued the past week, and we quote the market dull and depressed, with unaltered list:

AMERICAN REFINED IRON.

1 to 6 wide by ½ to 1 thick, 1 ½ to 2 4-10c. ½ to 1 ½ wide by ½ to 3 thick 2 ½ to 4-10c.

Round and square, ordinary sizes from ½ to 2 ½ inclusive 2 ½ to 4-10c.

Hoop Iron, ½ wide and upward.... 3 ½ to 4c.

Band Iron, from 1 ½ to 4 in. wide.... 3 to 3 ½c.

Horse Shoe Iron ½ to 1 wide by ½ to 1 thick.... 4 to 4 ½c.

Hoof.... 4 to 4 ½c.

Spikes.... 7 to 7 ½c.

HOLLAND.

(*Koch et Fluerboom*.)

ROTTERDAM, Aug. 1, 1876.—*Tin*.—The Netherland Society's auction of Charcoal averaged 43% guineas, and the usual price of charcoal has been perceptible, and 44 is now insisted upon, while Billiton is sold at 45, after selling October delivery at 42½. The July deliveries have been 13,122 lbs Banca, against 8,500 last year. Since January 1st altogether 63,575 and 100 Billiton, against 77,714 Banca and 313 Billiton, leaving the company's hands a stock on war rant of 83,539 lbs Banca and 130,1 Billiton, against 104,691 Banca and 135,1 Billiton. There are now also from Banca, by sailing vessels, but 380 piculs, against 17,884 last year. The stocks of Billiton in private hands is now 27,248 slab. *Lead*.—Stolberg has declined to 12

having been paid for Wallaroo, and £76, 10/- for Burr. In regard to Chili bars considerable business has been reported. Various prices have been realized, according to terms. Cash prompts are now about £73; prompt from two to three months, 10/- to 20/- more. This improvement is chiefly owing to the operations of speculators, and prices have taken too sudden an upward turn to insure the stability of the market for any lengthened period. As soon as recent speculators can turn over their purchases to a profitable account they will probably turn round quickly and "bear" the market once more; consumers, therefore, should not play into the hands of speculators, but act cautiously under present circumstances, and wait until the demand from legitimate sources warrants the payment of higher prices.

Tin.—The market has assumed a very unsettled appearance. Speculators may attempt to buoy up the market fictitiously, but, unless the consumption increases or supplies fall off, there is very little prospect of their turning the market to their own advantage. Prices may be upheld till the close of the month with the object of squeezing the "bears," and during the last day or two holders have succeeded in running up the price 20/- to 30/- per ton, but unless deliveries have been going on larger than it is expected, the stock is greatly reduced, there is no reason why enhanced prices should be paid. The market is a little excited and unsettled at the moment, and the opinion of the most impartial in the trade is that prices cannot advance unless the *bona fide* demand improves."

Latest Liverpool prices are:

	Iron: f. o. b. in Liverpool, per ton.			
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Merchant bar	6 15	0 0	7 0	0
Merchant bar, in Wales	6 5	0 0	6 10	0
Staffordshire	6 0	0 0	6 0	0
Hull	6 0	0 0	9 0	0
Sheets	9 15	0 0	10 15	0
Nail rod	7 10	0 0	9 0	0
Bar, best crown	7 5	0 0	8 10	0
Boiler plates	9 15	0 0	10 0	0

Tin Plates: f. o. b. in Liverpool, per box.

	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Charcoal, I. C.	1 4	6 0	1 6	5 0
Coke, I. C.	1 0	0 0	1 2	0

Copper: Delivered in Liverpool, per ton.

	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Bolt and Sheathing	84 0	0 0	0 0	0 0
Tile	76 0	0 0	0 0	0 0
Tough cake	75 0	0 0	0 0	0 0
Best selected	76 0	0 0	0 0	0 0

The Monthly Iron and Metal Circular of Messrs. Sanders Brothers, London, &c., dated July 24, is, in some respects, of considerable interest just now, and I therefore give rather long extracts from it, as follows:

Business. In metals is especially restricted, and almost without exception prices show a reduction as compared with the figures current a month since. As long as the downward tendency continues, the present marked indisposition to operate will last.

Copper.—Our present quotations are:

Compared with same date, 75.

Ores & Reg. £ s. d. £ s. d. £ s. d. £ s. d.

Chili Bars. 0 13 9 to 0 14 6 0 16 0 to 0 17 0 20 Unit

Ingots. 94 0 0

Eng. tough. 75 0 0 to 76 0 0 86 0 to 87 0 0 "

Eng. Selected. 76 0 0 to 77 0 0 87 0 0 to 88 0 0 "

Eng. Manufactured. 92 0 0 to 86 0 0 92 0 0 to 93 0 0 "

Month ended 30th June. 1874. 1875. 1876.

Exports to U. S. unmanufactured. 22,610 18,683 25,470

Exports to other countries. 200

Exports to other countries, manufactured. 23,455 18,773 21,011

Six months ended 30th June. 1874. 1875. 1876.

Exports to U. S., manufactured. 223 20 30

Exports to other countries, unmanufactured. 97,876 99,184 124,972

Exports to U. S., manufactured. 706 93 189

Exports to other countries, manufactured. 109,318 113,688 104,403

The next sale of Wallaroo is appointed for September, when about a similar quantity to that sold last month will be offered. The total stocks on the 1st of the present month, as compared with those on the 1st of June, showed scarcely any variation. English copper has partaken of the decline in other sorts, but low prices have not stimulated demand, and we have to report a very lifeless market for this article. Consumers will only purchase in a hand-to-mouth manner, and business is extremely difficult to put through. Manufactured copper continues in very quiet demand. A few orders for Indian sheets were placed last month; low prices, but the exchange with India renders business in that quarter for the time being almost entirely impracticable. The home trade does not evince much activity.

Rail.—£5, 12/6 for heavy sections, compared with £6, 15/ same date last year.

Month ended 30th June. 1874. 1875. 1876.

Exports to United States. 12,969 1,846 3

Exports to other countries. 59,650 56,242 36,899

Six months ended 30th June. 1874. 1875. 1876.

Exports to United States. 64,969 15,734 99

Exports to other countries. 362,399 248,574 181,526

The rail market has not undergone any particular change during the past month. South Wales makers appear to be extremely short of work, and display in almost all cases readiness to make considerable sacrifices rather than allow orders to pass them. Under these circumstances it is of course not easy to give an accurate idea of prices, as each order is made the subject of special negotiation.

Steel Rails.—This branch of the trade continues in a fairly active state, but does not present any special feature. Price depends entirely on specification; double headed rails of heavy sections for English roads have been sold as low as £7.5/ on trucks at the works; flange sections, which are lighter and more difficult to roll, could be placed at about £7.15/- free on board.

Spiegeleisen. Is in moderately good request, and there is a fair business doing at current figures. We quote good foreign makes, £4, 15/- f. o. b., continental port; English, £6, 10/- to £7, 2, 6/- according to manganese contents, say, 15 to 20 per cent.

Lead.—Our present quotations are:

Compared with same date, 1875.

Per ton. £ s. d. £ s. d.

W. B. 224 0 0 233 0 0

L. B. 20, 15/ 32, 15/

Lead Co. 20, 10/ 22, 10/

Ordinary brands. 20, 5/ 22, 0/

Month ended 30th June. 1874. 1875. 1876.

Tons. Tons. Tons. 171 255

Exports to United States. 3,305 3,271 2,808

6 mos. ended 30th June. 1874. 1875. 1876.

Tons. Tons. Tons. 1,901 1 682

Exports to other countries. 19,047 14,271 17,611

Lead has been very quiet throughout the whole month, and prices have declined to the

extent of about 5/ to 10/ per ton. The amount of business done has been small, and as we close there is very little demand stirring.

Regulus of Antimony.—£62 as compared with £58 same date last year. Business throughout the month has been somewhat limited, and we close with a quiet market.

Tin.—Our quotations to-day are:

Compared with same date, 1875.

Per ton. £ s. d. £ s. d.

English L. and F. Ingots. 279 0 0 285 0 0

" refined. 80 0 0 80 0 0

Banca. 21 0 0 21 0 0

Straits. 75 0 0 85 0 0

Australian. 73 10/ 78 10/

Month ended 30th June. 1874. 1875. 1876.

Cwts. Cwts. Cwts. 1,640 116 1,854

Exports to United States. 16,974 30,621 23,513

Exports to other countries. 9,491 6,254

Six months ended 30th June. 1874. 1875. 1876.

Cwts. Cwts. Cwts. 1,784 1,875 1,876

Exports to United States. 35,349 10,849 6,114

Exports to other countries. 53,180 44,788 48,175

The imports of tin into England have been:

Month ended June 30. Six months ended June 30.

Cwts. Cwts. Cwts. 1,674 1,949 1,197

Tons. Tons. Tons. 1,764 1,949 1,577

Stocks. 9,287 8,832 8,969

Banca in hands of the Dutch Trading Co. unsold. 2,044 2,310 1,792

Foreign tin afloat for Europe. 3,429 3,225 3,180

for Europe. 14,753 14,467 13,412 10,857

Foreign tin, after receding during the last week of June, to about £273 per ton, improved in the early part of this month, and touched as high as £275. This rise was consequent on the unusually heavy deliveries for the month of June, which from Holland and London amounted to 2420 tons—nearly 1600 tons being from London warehouse, a quantity 25 per cent. in excess of the average monthly delivery for the first five months of this year, and this increase is in face of the fact that tin plate makers are working two-thirds time only, and in some cases less. The market has eased off again since the spurt above alluded to, and we are now back to £273 for Straits and Australian, at which figure a steady business is passing. The stocks on 1st instant showed a considerable improvement for the month, as will be seen from above figures, and altogether the statistical position of tin, at the present time, is decidedly favorable. If the deliveries for the current month, which are being closely watched, turn out good, we shall probably see higher prices. The demand from the Continent continues pretty active. The Dutch Company announce that their next sale will take place on 26th instant, when 29,900 slabs will be offered. English Tin has remained during the month almost stationary in price, with £24 same date last year. The market has had a weakening tendency during the past month, and is in anything but a settled state. English has declined about 10/- per ton, to-day's quotation being £23 to £23, 10/- f. o. b.

Tin Plates. Compared with same date 1875.

I. C. Coke, ord. brands. 19/ to 20/ 22/ to 22/6

L. C. Coke, best brands. 21/6 to 23/ 24/ to 25/6

L. C. Char. ord. brands. 23/ to 24/ 26. 6 to 27. 6

L. C. Char. best brands. 25/ & upwards. 30/ & upwards.

Month ended 30th June. 1874. 1875. 1876.

Cwts. cwt. cwt. 1,769 1,605 1,806

Exports to United States. 1,819 4,175 3,595

6 mos. ended with 30th June. 1874. 1875. 1876.

Tons. Tons. Tons. 14,753 14,467 13,412

Exports to United States. 49,717 52,323 43,005

Exports to other countries. 13,817 19,807 21,350

The tin plate market has during the past two or three weeks improved materially, and a considerable amount of business has been done for the States. When coke tin got down as low as 18/- to 18/6, buyers came into the market and bought pretty freely, the consequence being that a good many makers found themselves well filled with work for a month or so, and have since been asking 1/ to 1/6 per box ad-

B. KREISCHER & SON,
New York Fire Brick &
STATEN ISLAND
CLAY RETORT WORKS,
Established 1845.

Office, 58 Goerck Street, cor. Delancy Street,
East River, New York.

The largest stock of Fire Brick of all shapes and sizes on hand, and made to order at short notice.

Cupola Brick, for McKenzie Patent, and others. Fire Mortar, Ground Brick, Clay and Sand. Superior Kaolin for Rolling Mills and Foundries. Stone Ware and other Fire Clay and Sand from my own mines at New Jersey and Staten Island by the cargo or otherwise.

Philadelphia Fire Brick

AND
Clay Retort Works,
AND KENSINGTON FIRE BRICK WORKS

Office, 23d and Vine, Philadelphia.

PHILIP NEWKUMET,
Successors to JOHN NEWKUMET, Proprietor
manufactures 9-inch Fire Bricks, Tiles, and Blocks
for Rolling Mills, Blast Furnaces, Foundries Gas
Works, Lime Kilns, Glass Houses, &c., &c.

Articles of every description made to order at
short notice, and in a very superior manner.

"CLAY RETORTS FOR SUGAR HOUSES."

National Fire Brick & Drain Pipe W'ks,
CHAS. ANNESS & SONS, Prop.,
Manufacturers of all kinds of FIRE CLAY.
Miners and Shippers of all kinds of FIRE CLAY.
Factory at SPA STEAMINGS, G. Perth
Amboy and Woodbridge, R.

Post Office address, Woodbridge, N. J.
Established 1845.

WOODBRIDGE, N. J.
Fire Brick Works.

WM. H. BERRY & CO.
Manufacturers of all forms and sizes of FIRE
BRICK, for Blast Furnaces, Rolling Mills, Gas Boxes
and Oven Tiles, and Stove Linings, made to order. Also
Fire Clay, Kaolin, Sand and Fire Mortar.

Brick Presses,
Oldest and Largest Establishment of the kind in the U. S.

F. L. & D. R. CARNELL,

1844 Germantown Avenue, Philadelphia
Manufacturers of Pennsylvania Brick Machine
Little Giant Pipe Machine, Fire and Red Brick
Presses, Clay Wheels, Tile Machines, Stampers,
Grinding Mills. Brick Yards fitted out for running
by steam or horse. Heavy and Light Castings. Send
for circular.

We keep only such goods as we are
able to sell at

LESS THAN MANUFACTURERS
prices. BETTS & BURGER,
95 Chambers Street, N. Y.

STEEL STAMPS.
LETTERS, FIGURES, &c.,
Of every description and for all purposes.
Best Work. Lowest Prices.

RICHARD H. ROGERS,
45 Ann Street, (Rear), - New York.
Orders by mail promptly attended to.

NAME PUNCHES.

JAMES HENSHALL,
Engineer, Machinist & Blacksmith,
1056 Beach St. PHILADELPHIA.

Drawings made to order. Repairing of all kinds
promptly attended to. Blacksmithing executed in
all its branches.

HOLSKE MACHINE CO.,
279 Cherry St., near Jefferson St.

ELEVATORS
For Hotels & Stores a specialty.
Machinery in General made to order.

HARDY & CO.,
Manufacturers of

Police & Fire Department
SUPPLIES.
Brass, German Silver & Lather Dog Collars.

102 ELM STREET, NEW YORK.

The Union Stove Works,
70 BEEKMAN ST., N. Y.

Established 1830. Manufacturers of

FURNACES, RANGES and STOVES.
In great variety, suitable for all parts
of the world.

Goodnow's
Patent
WASHER
CUTTER.

For cutting circles or washers out of leather, rubber,
paper or thin wood. It will cut any size, up to 6 in. di-
ameter, and can be used in an ordinary bit-stock.
Price \$12.00 per dozen.

GOODNOW & WIGHTMAN,
No. 23 Cornhill, Boston, Mass.

Manufactured by
Cranes Bros. Mfg. Co.

CHICAGO.
COOKE & BEGGS, Agts.
16 Cortlandt St., N. Y.

STEAM
PUMPS

WOODLAND FIRE BRICK CO.,
LIMITED.
Manufacture SUPERIOR
FIRE BRICK.,
Especially adapted for Steel and Siemens Furnaces.
WOODLAND, CLEARFIELD CO., PA.

NEWTON & CO.,

Successors to
PALMER, NEWTON & CO.,
ALBANY, N. Y., Manufacturers of

FIRE BRICK
Stove Linings,
Range and Heater Linings
Cylinder Brick, &c., &c.

Watson Fire Brick Manufactory

ESTABLISHED 1856.

JOHN R. WATSON, Perth Amboy, New Jersey.

Manufacturer of

FIRE BRICK,
For Rolling Mills, Blast Furnaces, Foundries,
Gas Works, Lime Kilns, Tanneries, Boiler
and Grate Setting, Glass Works, &c.

FIRE CLAY, FIRE SAND, AND KAOLIN FOR SALE.

A. HALL & SONS, Perth Amboy, N. J.

ESTABLISHED 1846.

HALL & SONS, Buffalo, N. Y.

ESTABLISHED 1866.

FIRE BRICK

of reliable quality for all purposes, manufactured of the best New Jersey Fire Clay. Also, ROCKINGHAM

WARE, YELLOW WARE, Fire Clay, Fire Sand, Kaolin

Ground Fire Brick, and Diamantine Building Brick.

The best fire clay from my own Clay Bed at Perth Amboy, N. J.

HENRY MAUER,

Late of the firm of MAUER & WEBER.

Proprietor of the

Excelsior Fire Brick & Clay

Retort Works,

Sole Manufacturer of French Pat, Roofing Tiles

and Hollow Brick.

WORKS: PERTH AMBOY, NEW JERSEY.

Office & Depot: 418 to 422 East 23d St., bet.

Ave. and Ave. A, New York.

BROOKLYN CLAY RETORT

AND

Fire-Brick Works,

No. 88 Van Dyke Street, Brooklyn, N. Y.

Edward D. White, Surviving Partner of the late firm

of J. R. Brick & Co.

M. D. Valentine & Bro

Manufacturers of

FIRE BRICK

And Furnace Blocks,

DRAIN PIPE & LAND TILE.

Woodbridge, - - - N. J.

TROY STOVE LINING

AND

Fire-Brick Works.

BELL & BACON.

Stove Linings & Specialty. TROY, N. Y.

JAS. C. BELL, JR. J. BLUST BACON.

Gen. B. Collins
DESIGNER
ENGRAYER ON WOOD
TO "The Iron Age"
WARREN ST.
NEW YORK

A. SWINTON
ENGRAYER ON WOOD
722 CHESTNUT STREET
PHILADELPHIA
BOOK ILLUSTRATIONS
VIEWS & BUILDINGS
PENN.

AST IRON PIPES
FOR
WATER & GAS
BRANCHES, RETORTS, ETC., ETC.

WARRIOR FOUNDRY & MACHINE COMPANY

PHILLIPSBURG, NEW JERSEY.

New York Office, No. 155 Broadway.

TURPENTINE and ROSIN BARREL
TRUSS HOOPS.

A large stock always on hand at lowest prices

Also full line of

Coopers' Tools

For Turpentine Trade.

Send for prices to

CHAS. E. LITTLE, 59 Fulton St., N. Y.

A. H. SPENCER,

Solicitor of Patents,

And Expert in Patent Cases.

28 State St., Room 10, Boston.

HOWSONS'

OFFICES FOR PROCESSION

UNITED STATES AND FOREIGN

PATENTS,

Forrest Buildings

119 SOUTH FOURTH ST., PHILADELPHIA,

AND MARBLE BUILDINGS

605 Seventh St. (Opposite U. S. Patent Office,

Washington, D. C.)

H. HOWSON,
Solicitor of Patents. C. HOWSON,
Attorney at Law.

Communications should be addressed to the

PRINCIPAL OFFICES, PHILADELPHIA.

DEALERS AND CONSUMERS

OF FILES

SHOULD PURCHASE THE

Nicholson or "Increment Cut" File

FOR THE FOLLOWING REASONS:

First.—They are made from the best quality of File Steel.

Second.—Each File undergoes a careful inspection after each operation, by critical inspectors, and none but perfect work allowed to pass.

Third.—They are cut by the "Increment" or irregular cut, therefore combine the advantages of both Hand and Machine work.

Fourth.—They will finish finer than Files of any other make of same degree of coarseness.

Fifth.—They will not "pin" or scratch like hand-cut Files.

Sixth.—The "Increment cut" File, by our records, will remove more stock with a given number of pounds applied than any other File with which we are acquainted.

Seventh.—All Files under seven inches are put up in boxes of one dozen each, and neatly labeled.

Eighth.—The large stock carried by us, combined with our superior facilities, enables us to fill the largest orders at the shortest possible notice.

Ninth.—We are constantly making careful tests of our Files by delicately constructed machinery, which automatically records the actual power applied, forward, backward and downward, at each stroke of the File, also the number of strokes, combined with the work performed, enables us not only to judge of the quality of our Steel for wear, but also of the cutting qualities of the File, and the ease (expressed in pounds) with which a given amount of work can be accomplished.

Finally.—Our Files are warranted to be hard, well cut and sound. They are exclusively used by many of the largest Railroads and Machinists in the country—and the vigorous growth of our reputation, not only for making a good article, but of our ability to furnish a good article cheap, is evidenced by the large number of Dealers and Jobbers who are handling our Files exclusively.

NICHOLSON FILE COMPANY, Providence, R. I.

SOLD BY HARDWARE DEALERS GENERALLY.

SUPPLIES

FOR

Railways, Machinists and Amateurs,
Gum and Leather Belting, Packings and Cotton
Waste, Babbit Metal.

FINE TOOLS

for Machinists and Amateurs; Barnes' Foot Power
Scroll Saw; Foot Lathes all kinds. Sole Agents
Baxter Steam Engine, Iron and Wood Working
Machinery. Send for Price Lists.

JACKSON & TYLER,
16 German St., Baltimore, Md.

COX & COX,

Counsellors at Law,

229 Broadway, NEW YORK.

Practice in cases relating to

PATENTS and

TRADE MARKS.

Before the

Courts and Patent Office.

Manufactured by

Cranes Bros. Mfg. Co.

CHICAGO.

COOKE & BEGGS, Agts.

Keystone Saw, Tool, Steel and File Works.

Front and Laurel Streets, Philadelphia.

HENRY DISSTON & SONS, Hand, Panel and Rip Saws and Handled Saws OF EVERY DESCRIPTION.

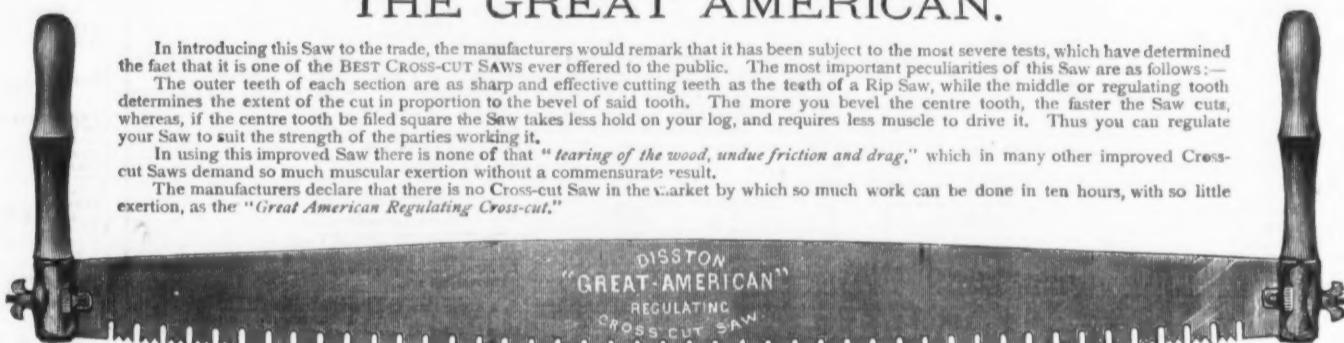
THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the **BEST CROSS-CUT SAWS** ever offered to the public. The most important peculiarities of this Saw are as follows:—

The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "*tearing of the wood, undue friction and drag,*" which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

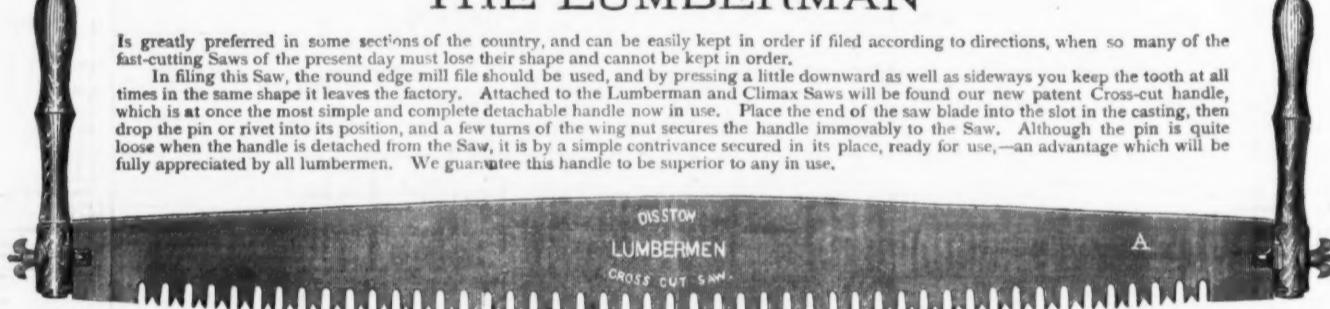
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "*Great American Regulating Cross-cut*."



THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

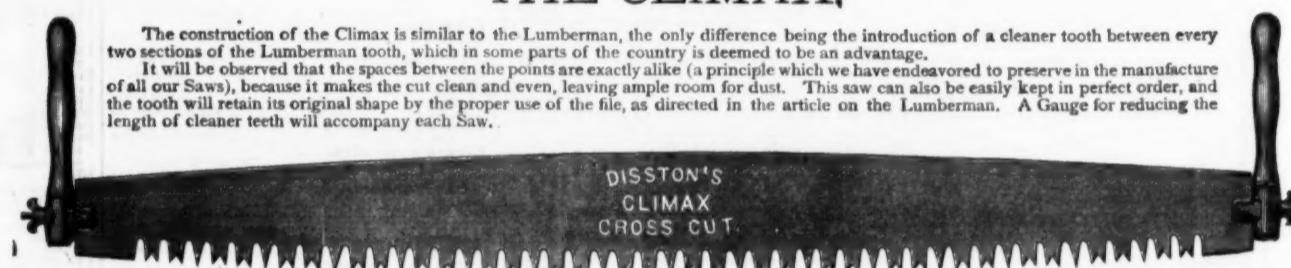
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

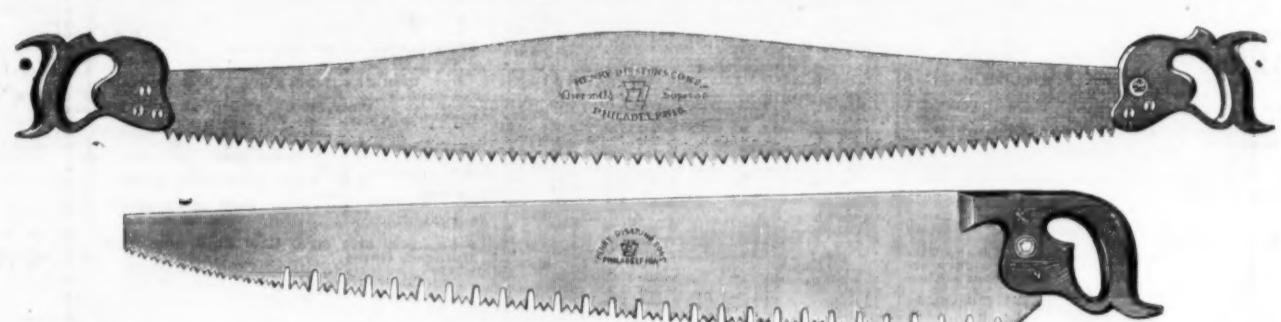
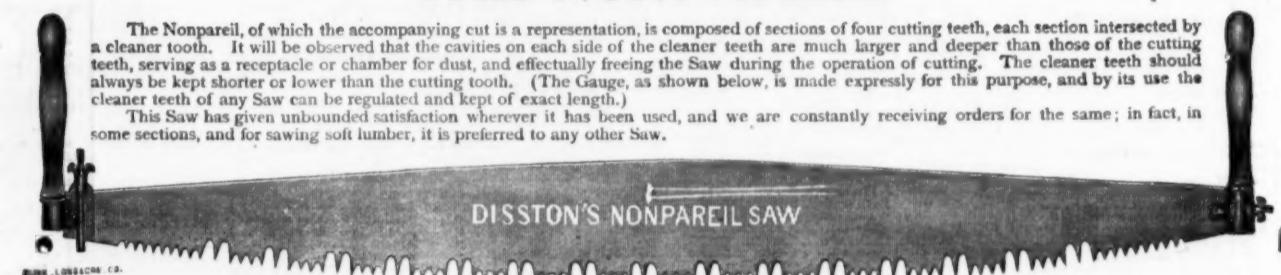
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting teeth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



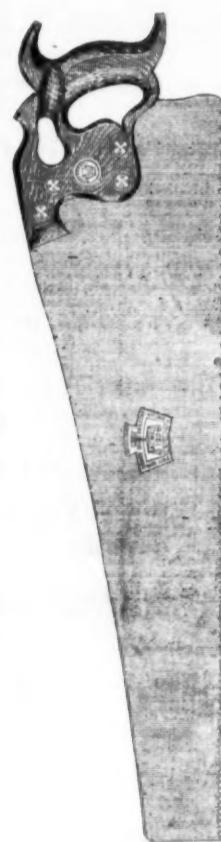
FULL COMBINATION SAW.



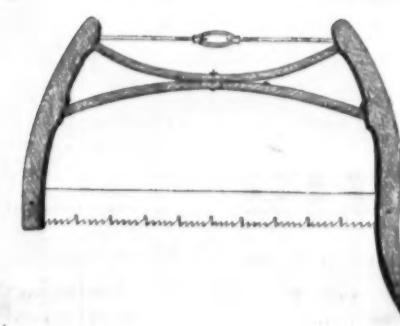
No. 1, California Flat Steel Back, Clock Spring Blade.



CENTENNIAL No. 76.



ACME No. 120.



HARDWARE.

Anvils, american.....	W B 15c, dis 20%
Wright's.....	W B gold 10 $\frac{1}{2}$ c; over 250 lbs 11c, gold
Armitage's Mouse Hole	gold 10 @ 10 $\frac{1}{2}$ c
Wilkinson's.....	W B gold 11c
Eagle Anvils (American).....	W B 10c dis 20%

HARDWARE.

ANVILS.		
American.	\$ 15c, dis 20%	
Wright's.	\$ 15c gold 10c; over 200 lbs 10c, gold 10c.	
Armstrong's Mouse Hole.	\$ 15c gold 10c	
Wilkinson's.	\$ 15c gold 10c	
Cagle Anvils (American).	\$ 15c dis 20%	
Apple Parers.		
(4 pieces).		
Table.		
Lightning.		
Pudson's.		
Heading.		
Union.		
Skeleton Paring, Coring and Slicing.	\$ 15c per doz net	
Bay State, Paring, Coring and Slicing.	\$ 12c per doz net	
C. Max Slicer.	\$ 8.00	
Asl. Sifters.		
J. C. Cornings' Barrel Head.		
Rival.		
Square.		
Ankers and Bits.		
Conn. Valley Mfg. Co.		
Douglas.		
Ives.		1st quality....dis 10c
Beechert French, Swift & Co.		
Genowd.		
Conn. Mfg. Co.		
Cook's.		
Diamond Hardware Co.		
Tell Mfg. Co.		
Cannings Bits.		
Lewis' Single Twist Bits.		
Andrews' Bits.		
Griswold's Patent Bits.		
Expansive Bits, Clean.	small, \$18; large, \$25	
" " ".	\$ 15c dis 15c	
" " ".	\$ 20c dis 15c	
" " ".	\$ 25c dis 20c	
" " ".	\$ 30c dis 20c	
" " ".	\$ 35c dis 20c	
" " ".	\$ 40c dis 20c	
" " ".	\$ 45c dis 20c	
" " ".	\$ 50c dis 20c	
Hollow Augers, Douglas'.		
" " ".	\$ 15c dis 10c	
French, Swift & Co.		
Bonney's Adjus.		
" " ".	\$ 15c dis 10c	
" " ".	\$ 18c dis 10c	
" " ".	\$ 20c dis 10c	
" " ".	\$ 25c dis 10c	
" " ".	\$ 30c dis 10c	
" " ".	\$ 35c dis 10c	
" " ".	\$ 40c dis 10c	
" " ".	\$ 45c dis 10c	
" " ".	\$ 50c dis 10c	
Gimlet Bits-Screw.	\$ 7.50, no screw, \$9.	dis 20c
Double Cut Gimlet Bits, Shepardson's.		
Ct. Valley Mfg. Co.	dis 10c	
Hartwell's.		
Douglas'.		
" " ".	dis 10c	
Morse's Bit Stock Drills, List of J. A. T., '76.		
Watrous Ship Augers.		
Vaughan's Post Hole.		
s. in. \$20.00; 7.5 and 9 in. \$25 per doz.		
Le d's.		
Avis. Brad Sets, &c.		
Avis, Sewing, Common.	per gross \$1.20-15c	
Best.	per gross \$1.50-20c	
Shouldered Peg.	per gross 22c	
Patent Pegs.	per gross 10c	
Shouldered Brad.	per gross 22c	
Brad Sets, Alken's.		
No. 42, \$10.50; No. 43, \$12.50.	dis 10c	
Clark's.		
Stanley's Excisor.	\$ 12.50 dis 10c	
Axes.		
Brook.	per doz \$12 @ 10c net	
D. R. Barton Tool Co.	per doz \$15 @ 10c dis 20c	
Cats.	per doz \$12 @ 10c dis 15c	
H. Clark's (J. C. W. & Co.) bro'dn't red rec'd doz \$10 net		
Hund's Razor Blade.		
Shunmons'.		
Morris.		
Ted Jackel.		
Cattle Lenders.		
Hothckiss' Sons'.		
Underhill's.		
Crown.		
John Leverett's.		
Ten Evec.		
M. H. Jones & Co.		
Nobies Mfg. Co.		
Elmer's.		
Axes.		
Common (Guy C. Hotchkiss, Field & Co.).	\$ 15c	
Solid Collar, Case Hardened, Chilled Box.	\$ 15c	
Axe Grease - Frazer's.		
Balances.		
Light or "Common."		
All other Spring balances.		
Hands.	- rated.	
Front.		
8 and 10 Plated List).		
Orcote.		
Hed Keys.		
Gray's Katchet.		
Bells.		
H. J. Light Brass.		
Extra Heavy.		
White Metal.		
Silver Chinese.		
Brass.		
Globe (Cone's Patent).		
Gong.		
Abe's.		
Yankee.		
Barton's.		
Cranks.		
Taylor's.		
Brook.		
Wester.		
Cow-Common Wrought.		
Sargent's.		
Kentucky "Star."		
Norway or Best.		
Superior.		
Cockeves.	1/4 in. 28c; 1 1/2 in. 33c; 1 1/2 in. 36c.	
Cocks.		
Carving.		
Lock and Globe.		
Lever Slides.		
Ale and Beer.		
Coffee Mills.		
Board and Box.		
Brighton.		
Increase Wilson's.		
Schoon Pat.		
French Steel.		
The Swift.		
Compas and Dividers.		
Bensis & Call Co.'s.		
Cook's.		
Excisor.		
Peck Stow & Wilcox.		
Miller's Patent.		
Emerson's.		
Bradley's.		
Chas. E. Little.		
D. K. Barton Tool Co.		
Corkscrews.		
Corn Knives and Cutters.		
Bradley's.		
Cro. Bars.		
Iron, Steel points.		
Crackles - Gantier & Co.		
Curling Irons, &c.		
1/2, 3/4, 1 1/2, 2 1/2, 3 1/2, 4 1/2, 5 1/2, 6 1/2, 7 1/2, 8 1/2, 9 1/2, 10 1/2, 11 1/2, 12 1/2, 13 1/2, 14 1/2, 15 1/2, 16 1/2, 17 1/2, 18 1/2, 19 1/2, 20 1/2, 21 1/2, 22 1/2, 23 1/2, 24 1/2, 25 1/2, 26 1/2, 27 1/2, 28 1/2, 29 1/2, 30 1/2, 31 1/2, 32 1/2, 33 1/2, 34 1/2, 35 1/2, 36 1/2, 37 1/2, 38 1/2, 39 1/2, 40 1/2, 41 1/2, 42 1/2, 43 1/2, 44 1/2, 45 1/2, 46 1/2, 47 1/2, 48 1/2, 49 1/2, 50 1/2, 51 1/2, 52 1/2, 53 1/2, 54 1/2, 55 1/2, 56 1/2, 57 1/2, 58 1/2, 59 1/2, 60 1/2, 61 1/2, 62 1/2, 63 1/2, 64 1/2, 65 1/2, 66 1/2, 67 1/2, 68 1/2, 69 1/2, 70 1/2, 71 1/2, 72 1/2, 73 1/2, 74 1/2, 75 1/2, 76 1/2, 77 1/2, 78 1/2, 79 1/2, 80 1/2, 81 1/2, 82 1/2, 83 1/2, 84 1/2, 85 1/2, 86 1/2, 87 1/2, 88 1/2, 89 1/2, 90 1/2, 91 1/2, 92 1/2, 93 1/2, 94 1/2, 95 1/2, 96 1/2, 97 1/2, 98 1/2, 99 1/2, 100 1/2, 101 1/2, 102 1/2, 103 1/2, 104 1/2, 105 1/2, 106 1/2, 107 1/2, 108 1/2, 109 1/2, 110 1/2, 111 1/2, 112 1/2, 113 1/2, 114 1/2, 115 1/2, 116 1/2, 117 1/2, 118 1/2, 119 1/2, 120 1/2, 121 1/2, 122 1/2, 123 1/2, 124 1/2, 125 1/2, 126 1/2, 127 1/2, 128 1/2, 129 1/2, 130 1/2, 131 1/2, 132 1/2, 133 1/2, 134 1/2, 135 1/2, 136 1/2, 137 1/2, 138 1/2, 139 1/2, 140 1/2, 141 1/2, 142 1/2, 143 1/2, 144 1/2, 145 1/2, 146 1/2, 147 1/2, 148 1/2, 149 1/2, 150 1/2, 151 1/2, 152 1/2, 153 1/2, 154 1/2, 155 1/2, 156 1/2, 157 1/2, 158 1/2, 159 1/2, 160 1/2, 161 1/2, 162 1/2, 163 1/2, 164 1/2, 165 1/2, 166 1/2, 167 1/2, 168 1/2, 169 1/2, 170 1/2, 171 1/2, 172 1/2, 173 1/2, 174 1/2, 175 1/2, 176 1/2, 177 1/2, 178 1/2, 179 1/2, 180 1/2, 181 1/2, 182 1/2, 183 1/2, 184 1/2, 185 1/2, 186 1/2, 187 1/2, 188 1/2, 189 1/2, 190 1/2, 191 1/2, 192 1/2, 193 1/2, 194 1/2, 195 1/2, 196 1/2, 197 1/2, 198 1/2, 199 1/2, 200 1/2, 201 1/2, 202 1/2, 203 1/2, 204 1/2, 205 1/2, 206 1/2, 207 1/2, 208 1/2, 209 1/2, 210 1/2, 211 1/2, 212 1/2, 213 1/2, 214 1/2, 215 1/2, 216 1/2, 217 1/2, 218 1/2, 219 1/2, 220 1/2, 221 1/2, 222 1/2, 223 1/2, 224 1/2, 225 1/2, 226 1/2, 227 1/2, 228 1/2, 229 1/2, 230 1/2, 231 1/2, 232 1/2, 233 1/2, 234 1/2, 235 1/2, 236 1/2, 237 1/2, 238 1/2, 239 1/2, 240 1/2, 241 1/2, 242 1/2, 243 1/2, 244 1/2, 245 1/2, 246 1/2, 247 1/2, 248 1/2, 249 1/2, 250 1/2, 251 1/2, 252 1/2, 253 1/2, 254 1/2, 255 1/2, 256 1/2, 257 1/2, 258 1/2, 259 1/2, 260 1/2, 261 1/2, 262 1/2, 263 1/2, 264 1/2, 265 1/2, 266 1/2, 267 1/2, 268 1/2, 269 1/2, 270 1/2, 271 1/2, 272 1/2, 273 1/2, 274 1/2, 275 1/2, 276 1/2, 277 1/2, 278 1/2, 279 1/2, 280 1/2, 281 1/2, 282 1/2, 283 1/2, 284 1/2, 285 1/2, 286 1/2, 287 1/2, 288 1/2, 289 1/2, 290 1/2, 291 1/2, 292 1/2, 293 1/2, 294 1/2, 295 1/2, 296 1/2, 297 1/2, 298 1/2, 299 1/2, 300 1/2, 301 1/2, 302 1/2, 303 1/2, 304 1/2, 305 1/2, 306 1/2, 307 1/2, 308 1/2, 309 1/2, 310 1/2, 311 1/2, 312 1/2, 313 1/2, 314 1/2, 315 1/2, 316 1/2, 317 1/2, 318 1/2, 319 1/2, 320 1/2, 321 1/2, 322 1/2, 323 1/2, 324 1/2, 325 1/2, 326 1/2, 327 1/2, 328 1/2, 329 1/2, 330 1/2, 331 1/2, 332 1/2, 333 1/2, 334 1/2, 335 1/2, 336 1/2, 337 1/2, 338 1/2, 339 1/2, 340 1/2, 341 1/2, 342 1/2, 343 1/2, 344 1/2, 345 1/2, 346 1/2, 347 1/2, 348 1/2, 349 1/2, 350 1/2, 351 1/2, 352 1/2, 353 1/2, 354 1/2, 355 1/2, 356 1/2, 357 1/2, 358 1/2, 359 1/2, 360 1/2, 361 1/2, 362 1/2, 363 1/2, 364 1/2, 365 1/2, 366 1/2, 367 1/2, 368 1/2, 369 1/2, 370 1/2, 371 1/2, 372 1/2, 373 1/2, 374 1/2, 375 1/2, 376 1/2, 377 1/2, 378 1/2, 379 1/2, 380 1/2, 381 1/2, 382 1/2, 383 1/2, 384 1/2, 385 1/2, 386 1/2, 387 1/2, 388 1/2, 389 1/2, 390 1/2, 391 1/2, 392 1/2, 393 1/2, 394 1/2, 395 1/2, 396 1/2, 397 1/2, 398 1/2, 399 1/2, 300 1/2, 301 1/2, 302 1/2, 303 1/2, 304 1/2, 305 1/2, 306 1/2, 307 1/2, 308 1/2, 309 1/2, 310 1/2, 311 1/2, 312 1/2, 313 1/2, 314 1/2, 315 1/2, 316 1/2, 317 1/2, 318 1/2, 319 1/2, 320 1/2, 321 1/2, 322 1/2, 323 1/2, 324 1/2, 325 1/2, 326 1/2, 327 1/2, 328 1/2, 329 1/2, 330 1/2, 331 1/2, 332 1/2, 333 1/2, 334 1/2, 335 1/2, 336 1/2, 337 1/2, 338 1/2, 339 1/2, 340 1/2, 341 1/2, 342 1/2, 343 1/2, 344 1/2, 345 1/2, 346 1/2, 347 1/2, 348 1/2, 349 1/2, 350 1/2, 351 1/2, 352 1/2, 353 1/2, 354 1/2, 355 1/2, 356 1/2, 357 1/2, 358 1/2, 359 1/2, 360 1/2, 361 1/2, 362 1/2, 363 1/2, 364 1/2, 365 1/2, 366 1/2, 367 1/2, 368 1/2, 369 1/2, 370 1/2, 371 1/2, 372 1/2, 373 1/2, 374 1/2, 375 1/2, 376 1/2, 377 1/2, 378 1/2, 379 1/2, 380 1/2, 381 1/2, 382 1/2, 383 1/2, 384 1/2, 385 1/2, 386 1/2, 387 1/2, 388 1/2, 389 1/2, 390 1/2, 391 1/2, 392 1/2, 393 1/2, 394 1/2, 395 1/2, 396 1/2, 397 1/2, 398 1/2, 399 1/2, 300 1/2, 301 1/2, 302 1/2, 303 1/2, 304 1/2, 305 1/2, 306 1/2, 307 1/2, 308 1/2, 309 1/2, 310 1/2, 311 1/2, 312 1/2, 313 1/2, 314 1/2, 315 1/2, 316 1/2, 317 1/2, 318 1/2, 319 1/2, 320 1/		

Steel.

SULZBACHER, HYMAN, WOLFF & CO.,
IMPORTERS OF
IRON AND STEEL.

Sole Agents for the Sale of the Celebrated
PR. HOMOGENOUS DEC' CAST STEEL, GUN BAR-
RELS, MOULDS AND ORDNANCE.

Sole Agents for **COCKER BROTHERS, Limited.**
Successors to
SAM'L. COCKER & SON, (ESTABLISHED 1752.)
SHEFFIELD, ENGLAND.

Manufacturers of
"EXTRA" CAST STEEL, SHEAR, SHEET AND
BLISTER STEEL.

Best Cast Steel Wire Rods and Steel Wire of the finest quality for all Purposes.
Sole makers of **COCKER'S "METEOR" WIRE PLATES.**

Railroad Supplies.
Sole Agents for the **GENUINE NAXOS EMERY, CLOTH, PAPER, &c.**
Office and Warehouse, 46 Cliff Street, New York.

F. W. MOSS,

Successor to JOSHUA MOSS & GAMBLE BROS.
FRANKLIN WORKS,
WADSWELL BRIDGE WORKS,
WALKLEY WORKS,
SHEFFIELD, ENGLAND.

STEEL AND FILES.

Principal Depots: 80 John St., N. Y., and 512 Commerce St., Phila.
MOSS & GAMBLE SUPERIOR C. S. "FULL WEIGHT" FILES,

Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

WARRANTED CAST STEEL, especially adapted for Dies and TURNING TOOLS, DRILLS, COLD CHISELS, PUNCHES and all kinds of MACHINISTS TOOLS. Celebrated Improved Mild Centre Cast Steel, for Taps, Reamers, and Milling Tools, warranted not to crack in hardening Taps of any size. Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs. English Spring and Plow Plate Steel.

Sheet Cast Steel Shear, German, Round Machinery, Hammer, Fork and Shovel Steel
GENERAL MERCHANT.

Isaac Jenks & Sons,
MINERVA AND BEAVER WORKS, WOLVERHAMPTON, ENGLAND.
MANUFACTURERS OF
"JENKS" SPRING STEEL, "MINERVA" SWEDES, AND "ANGLO" CAST SPRING STEEL
"JENKS" TIRE, TOE CORKE, SLEIGH SHOE, BLISTER, AND PLOW STEEL;
ALSO,
"BEAVER" PLOW, TIRE, AXE, AND SHEET IRON.

VAN WART & McCOY, Agents, 134 & 136 Duane Street, N. Y.

J. & RILEY CARR,

MANUFACTURERS OF SUPERIOR

STEEL

For Tools, Cutlery, Saws, Files, Augers, Gimblets, &c.; Sheet Cast Steel for SPRINGS AND STAMPING COLD;

ALSO THE CELEBRATED

DOG BRAND FILES.

Unsurpassed, if equalled, in quality.

Bailey Lane Works, Sheffield, England.

Warehouse, 82 John St., New York.

Established 1810.



HENRY MOORE, Attorney.

G. SANDERSON & CO.,

Manufacturers of all descriptions of

STEEL.

SHEFFIELD, ENGLAND.

Particular attention is paid to quality and temper for

Files, Saws, Table and Pocket Cutlery, Augers, Shovels, &c.

ALSO STEEL of superior quality for Turning Tools, Taps, Dies, Drills, &c.

Hot and Cold Rolled Sheets for Clock Springs, Corsets Clasps, Pens, &c.

Makers of the Celebrated **ROCK BORING DRILL STEEL.**

Warehouse, 102 John Street, New York.

ALBANY & RENSSELAER IRON & STEEL CO.,

TROY, N. Y.,

Office in New York City, 56 BROADWAY.

MANUFACTURERS OF

Bessemer Railway Steel,
MERCHANT BARS, TIRE AND SHAFTING,

Railroad Iron, Pig Iron, Merchant and Ship Iron,
AGENCIES IN BOSTON AND PHILADELPHIA.

Steel.

SANDERSON BROTHERS & COMPANY,
(LIMITED)

DARNALL WORKS,
ATTERCLIFFE FORGE, { SHEFFIELD, ENGLAND.

Sole Manufacturers of the CELEBRATED

CAST STEEL,

Warranted most **SUPERIOR** and **UNSURPASSED** for
TOOLS and **GRANITE ROCK DRILLS.**

A full assortment of this universally approved OLD BRAND of
English Steel, and

ARMITAGE'S GENUINE MOUSEHOLE ANVILS,

For Sale by

EDWARD FRITH, 16 Cliff Street, New York.

FRANCIS HOBSON & SON,
95 John Street, NEW YORK,

Sole Manufact'rs of "**CHOICE**" Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

Don Works, Sheffield, England.

S. & C. WARDLOW,

MANUFACTURERS OF THE CELEBRATED

Cast and Double Shear
STEEL,

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table, Carving, Butcher and Shoe Knives, Turning Tools, Dies, Files, Clock or other Springs, Saws and Tools of every variety.

SHEFFIELD, ENGLAND.

Office of S. & C. WARDLOW, 95 John Street, New York.

In calling the attention of consumers of Steel, in any of the varieties above mentioned, we would respectfully assure them of our ability to supply an article, that cannot be equalled in quality, temper, and adaptation in all respects to the various purposes for which it may be required. Half a century of practical experience, in all departments of Steel manufacture, a long established reputation in England, and the Continent of Europe, and in the Eastern Islands principally of this Country, encourage us to solicit a unusual trial of our Steel for the above or other purposes for which a first class material, in quality, temper, and durability, is needed.

JOHN NICHOLSON & SONS,

MOWBRAY STEEL WORKS, Sheffield, England.

Manufacturers of all descriptions of **CAST STEEL**, especially **BEST CAST STEEL** for Axes and Edge Tools.

NEW YORK OFFICE, 33 Chambers Street.

Boston Agency, F. A. HOWARD, 38 Kilby St., Boston.

MILLER, METCALF & PARKIN,
Crescent Steel Works,
PITTSBURGH, PA.

Manufacturers of all Descriptions of

STEEL,
EQUAL TO ANY IN THE MARKET.

Office, 339 Liberty Street, PITTSBURGH, PA.

CHROME STEEL COMPANY,

MANUFACTURERS OF

CHROME CAST STEEL,

WARRANTED SUPERIOR TO ANY STEEL IN THE MARKET—EITHER ENGLISH OR AMERICAN—FOR EVERY PURPOSE.

Principal Office & Works, Kent Ave. and Keppel St., Brooklyn, E. D. N. Y.

AGENCIES,

Kimbark Bros. & Co., Chicago, Ills.

Huntington Hopkins & Co., San Francisco and Sacramento, Cal.

M. M. Buck & Co., St. Louis, Mo.

Cincinnati Branch, 123 Central Ave., George Kinsey, Manager.

Potter & Hoffman, Philadelphia, Pa.

Geo. Dryer & Co., Boston, Mass.

Wood & Leggett, Hamilton, Ont.

George Kinsey, Manager.

JONAS, MEYER & COLVER,

CONTINENTAL STEEL WORKS, ATTERCLIFFE, SHEFFIELD, ENGLAND.

Manufacturers of

EXTRA BEST WARRANTED CAST STEEL,

For all Descriptions of Fine Tools.

J. M. & C. Manufacture Tool Steel exclusively.

H. DIAMOND & CO., Principal Agents for the United States and Canada.

Office and Warehouse, No. 6 Ford Street, HARTFORD, CONN.

Steel.

Sheffield Steel Works.

(Established in 1848.)

SINGER, NIMICK & CO.

Pittsburgh, Pa.,

Manufacturers of Extra Quality Tool

CAST STEEL,

Patent Rolled

SAW PLATES,

All descriptions of Cast and German

Spring and Plow Steel

Elliptic and Side Springs, Seat Springs,

AXLES, STEEL TIRE,

Plow Wings, Shares, Cultivators,

Reaper Bars, Crow Bars, &c., &c.

Warehouse, 22 Water and 100 First Streets.

Gunpowder.

GUNPOWDER

DUPONT'S

Sporting, Shipping, and Mining
POWDER.

DUPONT'S GUNPOWDER MILLS,

ESTABLISHED IN 1801,

Have maintained their great reputation for 75 years. Manufacture the

Celebrated Eagle Ducking, Eagle Rifle, & Diamond Grain Powder.

THE MOST POPULAR POWDER IN USE.
Also, SPORTING, MINING, SHIPPING, AND BLASTING POWDER.

of all kinds and descriptions.
For sale in all parts of the country. Represented by

F. L. KNEELAND

70 Wall Street, NEW YORK.

GUN-POWDER

LAFLIN & RAND POWDER CO.,

26 Murray Street, N. Y.,

Invite the attention of the Hardware Trade to their facilities for delivering

Blasting, Mining and Rifle
POWDER

In every part of the United States.

From having agencies and magazines at all prominent points, beside our works at

Kingston, Newburgh, Saugerties and Schaghticoke, N. Y.; Moosic, Rushdale and Crosson, Pa.; and Platteville, Wis.

The superiority is well known of our brands of Sporting Powder.

Orange Rifle, Orange Ducking, Orange Lightning.

ELECTRIC BLASTING APPARATUS.

SAFETY-FUSE at wholesale.

Clark's Patent Noiseless

Pressure Blowers and

Exhaust Fans.

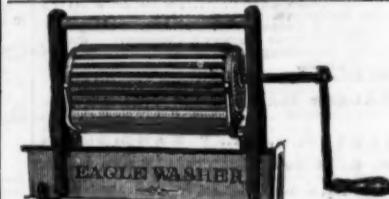
R. W. WILDE, Agent,

44 Cortlandt St., New York

Portable and Stationary

Engines, Boilers, Grist

Mills, etc.



The Attention of Dealers is invited to the

EAGLE WASHER.

It embodies several important new features, a very complete arrangement of parts, and is finished in construction. Send for descriptive circular and prices to the manufacturer.

OAKLEY & KEATING,

40 Cortlandt St., N. Y.

WASHINGTON, D. C., Sept. 18, 18

Steel.

**THE EDGAR THOMSON STEEL CO.,
LIMITED.**
MANUFACTURERS OF



General Office and Works at Bessemer Station (Penn. R. R.), Allegheny County, Pa.

New York Office, 57 Broadway.

The members of the Edgar Thomson Steel Company, Limited, have had large experience in manufacturing and in railway management; their works are the most complete in the world, with all the late improvements, and are located in the best Bessemer metal district in the United States, and their managing officers are experienced in the manufacture of Bessemer Steel.

The Company warrants its rails equal in quality to any manufactured in the United States.

Rails of any weight or section furnished on short notice. Orders for trial lots solicited.

Branch Office and P. O. Address, No. 41 Fifth Ave., Pittsburgh, Pa.
D. McCANDLESS,
Chairman.

W. M. P. SHINN,
General Manager.

LABELLE STEEL WORKS.

SMITH, SUTTON & CO.,
MANUFACTURERS OF ALL KINDS OF

STEEL.

Also, Springs, Axles, Rake Teeth, &c.

OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny, Post Office Address, Pittsburgh, Pa.

MIDVALE STEEL WORKS.

Works and Office, NICETOWN, PHILADELPHIA, PA.

MANUFACTURERS OF

CRUCIBLE AND OPEN HEARTH STEEL,

Steel Locomotive Tires. Steel Axles of every description.

STEEL FORGINGS UP TO 8000 lbs. IN WEIGHT.

Solid Steel Castings, Hammer Dies, Frogs, Crossings, etc.

BEST TOOL, MACHINERY AND SPRING STEELS.

WM. SELLERS, Pres. CHAS. A. BRINLEY, Sup't. MARRIOTT C. SMYTH, Sec. & Treas.

ANDERSON & WOODS,

MANUFACTURERS OF

Best Refined CAST STEEL.

CAST and GERMAN PLOW and SPRING STEEL.

FIRST AVENUE AND ROSS STREET, PITTSBURGH, PA.

D. G. GAUTIER & CO.,

MANUFACTURERS OF

Hammered and Rolled STEEL of every description

JERSEY CITY, NEW JERSEY.

DUDLEY G. GAUTIER. JOSIAH H. GAUTIER.

**PENNSYLVANIA
GRAPHITE MINING AND MFG. CO.,**
Office at READING, PA.

Miners and Manufacturers of all kinds and grades of

PLUMBAGO

For Crucibles, Lubricating, Lead Pencils, Powder Glaze, Stove Polish, Piano Manufacturing, Electrotyping, &c., &c.

G. WEBSTER PECK,

Manufacturers' Agent, 110 Chambers Street, N. Y.

AGENCIES:

MILWAUKEE MFG. CO. Kasson's Pat. Auger Machine Bits.
RACINE HARDWARE MFG. CO. Florists' Goods, Builders' Hardware and Jewelers' Machinery.
ALEX. M. LESLEY, Zero Refrigerators.
B. L. WALKER, Lawn Mowers.
BAILEY TOOL CO'S. Planes, &c.
ATHOL MACHINE CO., Bit Braces, &c.
SIMPSON'S ADJUSTABLE PARALLEL VISES.

**C. RIESSNER & CO.,
MANUFACTURERS,**

No. 242 Pearl Street, NEW YORK

"SUMMER QUEEN"

Oil Cook Stove.

FOUR SIZES.

Suitable for all purposes, for Cooking, Baking and Ironing.

NON-EXPLOSIVE.

Centennial Water Heater.



Patented June 13, 1876.

The most practical invention for heating steam tables, wash boilers, bath tubs, &c. Will be supplied with Leland's Pat. couplings.

NEW YORK, April 3d, 1876.

DEAR SIR: We beg to inform you that we are the Sole Patentees and Proprietors of the Patent of the Oil Cook Stove called the "SUMMER QUEEN," and will protect you in any sales you may be pleased to make for us against the threats, notices or molestation of any persons whatsoever.

Yours truly,

C. RIESSNER & CO.

Hardware.

SPEAR & JACKSON,

Sheffield, England.

MANUFACTURERS OF



THE ORDER OF FRANCIS JOSEPH.



Saws, Files, Edge Tools & Steel.

JOHN L. FISHER, Agent,

89 Chambers Street, NEW YORK.

JOHN WILSON'S CELEBRATED

BUTCHERS' KNIVES,

BUTCHERS' STEELS,

AND

SHOE KNIVES.

THE TRADE MARK, IN ADDITION
TO THE NAME,
IS STAMPED UPON EVERY ARTICLE MANUFACTURED BY

JOHN WILSON.



GRANTED A.D. 1766, BY THE
CORPORATION OF CUTLERS OF SHEFFIELD,
AND PROTECTED BY ACT OF PARLIAMENT.

WORKS:—SYCAMORE STREET. SHEFFIELD. ESTABLISHED in the Year 1750.

HERMANN BOKER & CO.,

OFFICES AND WAREHOUSES:

NEW YORK, 101 and 103 Duane and 91 and 93 Thomas Streets.

RENSCHEID and SOLINGEN (Prussia). H. BOKER & CO.

SHEFFIELD (England), No. 3 Arundel Lane, Represented by Mr. ARTHUR LEE.

LIEGE (Belgium), Represented by Mr. LOUIS MULLER.

Manufacturers and Importers of Cutlery, Guns, Hardware and Railroad Material.

Proprietors of TRENTON VISE AND TOOL WORKS, Trenton, N. J.—Vises, Picks, Mattocks, Grub Hoes, Sledges, Hammers, Bridge Work, Turn Tables, etc.

Proprietors of the MANHATTAN CUTLERY CO., "O. K." Razors.

LAMSON & GOODNOW MFG. CO., Shelburne Falls, Mass.—Table Cutlery and Butcher Knives.

W. & S. Butcher's Files, Edge Tools and Razors, the largest stock in the United States.

Geo. Wostenholm & Son's Knives, Scissors and Razors, the largest stock in the U. S.

John Wilson's Butcher and Shoe Knives.

Peter Wright's and Armistead Anvils.

We always have on hand a full assortment of

German and English Hardware, Cutlery, Guns, Gun Material, Chains, Heavy Goods.

Bemis & Call Hardware & Tool Co.



PAATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, Case-hardened throughout, and not only combine all of the superior qualities of our cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a Combination which has no equal.

For Circulars and Price List, address,

BEMIS & CALL HARDWARE & TOOL CO. Springfield, Mass.



The American Machine Co.,

Manufacturers of the celebrated



CROWN WRINGERS and CROWN FLUTERS

The most popular in the market.

Office, 430 Walnut Street, Philadelphia, Pa.

G. W. Bradley's Edge Tools.

Butchers' Cleavers, Butchers' Choppers, Axes and Hatchets, Grub Hoes and Mattocks, Mill Picks, Box Chisels and Scrapers.

FOR SALE BY

MARTIN DOSCHER, Agent, 96 Chambers Street, N. Y.

MALTBY, CURTISS & CO.,

Manufacturers of METAL KEY MAPLE AND ROSEWOOD FAUCETS.

Also Manufacturers of

Capewell's Giant Nail Puller.

The Buell Peg Float

AND THE

Little Giant Tack Puller.

34 READE ST., N. Y.



Emery, Grindstones, &c.

EMERY
WELLINGTON MILLS.

USE THE BEST.

THE BEST IS ALWAYS
THE CHEAPEST.



SALE AGENCIES:
Macomber, Bigelow & Dowse, Boston, Mass.
Homer, Foote & Co., Springfield, Mass.
C. Foster & Co., Worcester, Mass.
J. Clark Wilson & Co., New York City.
Chas. M. Ghislain, Philadelphia, Pa.
Belcher Bros., Providence, R. I.
Baeder, Adamson & Co., Chicago, Ill.
Perin and Gaff Mfg. Co., Cincinnati, O.
Clemens Vonnegut, Indianapolis, Ind.
Geo. M. Way & Co., Hartford, Ct.
F. S. Bradley & Co., New Haven, Ct.
Apothecaries' Hall Co., Waterbury, Ct.
W. Blingham & Co., Cleveland, O.
M. M. Buck & Co., St. Louis, Mo.

Sold by all Hardware Dealers

BRADY MFG. CO.,

Manufacturers of

Emery Wheel Machinery

Keep constantly on hand everything pertaining to
USE OF EMERY.

Automatic Knife Grinders.

Universal Grinding Machines, Belt Grinders, Disc Grinders, Buffing Machines, Buffing Jacks, Flange Pulleys, Universal Surfacing Machines.
Send for Illustrated Catalogue.

240, 242 & 244 Plymouth St., Brooklyn, N. Y.

**Walter R. Wood,
GRINDSTONES.**



SOLE AGENT OF THE
BEREA STONE CO., of Ohio.
NOVA SCOTIA and other brands.
283 & 285 Front Street, New York.

**WORTHINGTON & SONS,
North Amherst, Ohio.**

Manufacturers of

SCYTHE STONES.

"Star," "Diamond,"
"Huron," "Round English,"
"Darby Creek," "Community,"
"Manchester," "Indian Pond."
Price list on application.

Established 1838.
Beyn Bros. Mfg. Co., Easthampton, Ct., Manufacturers of
Sleigh Bells. House, Tea, Hand, Gong Bells, &c.
Bell Metal Kettles. Centennial Exhibit No. 72, Main Building.

THE CURVE SCRIBE.
The Curve Scribe is a combination of a compass and a scriber, and is constructed with great ingenuity.
The Hartford Curve Scribe Co., 224 Broadway, N. Y. Price \$1.00. 2500 pieces \$2.00.
Send for Illustrated Catalogue.

'DRAW CUT'
HUTCHERS' MACHINES
Choppers, Hand and Power.
Stuffers, Lard Presses.
Warranted thoroughly made and the Best in Use.
MURRAY IRON WORKS
Burlington, Ia.

ENTERPRISE MANUFACTURING CO. OF PA.
PHILADELPHIA,

Patented Hardware Manufacturers and Iron Founders,



Mrs. Potts' Patent Sad-Irons,

(IMPROVED.)

COFFEE, DRUG & SPICE MILLS, MEASURING FAUCETS,
SAUSAGE STUFFERS, LARD, FRUIT & JELLY
PRESSERS, CHEESE KNIVES, TOBACCO
CUTTERS, BUNG-HOLE BORERS, etc., etc., etc.
FOR SALE BY THE HARDWARE TRADE.
SEND FOR ILLUSTRATED CATALOGUE.

WHEELING HINGE CO.,

Wheeling, West Va.,

Manufacturers of

Wrought Butts, Strap & T Hinges, Wrought Hooks,
Hasps & Staples, Wrought Repair
Links & Washers.

GRAHAM & HAINES, Sole Agents, 113 Chambers & 95 Reade Sts., N. Y.

**QUACKENBUSH, TOWNSEND & CO.,
Hardware, Cutlery, &c.**

85 Chambers & 67 Reade Sts., N. Y.

Depot for
HOS. JOWITT & SONS,
(Sheffield, England.)
ILES and HORSE RASPS.

Rough & Ready
And
CLIPPER SCYTHES,
Warranted.



Patented March 4, 1873.

The Cowles Hardware Co.,
UNIONVILLE, CONN.,

Manufacturers of

HARDWARE & HOUSE-FURNISHING GOODS.

GEO. DUNHAM, Pres.

G. S. KNAAPP, Treas.

MARTIN COWLES, Sec.

Screws Drivers of all varieties, Box Scrapers, Box Openers, Garden Hoes, Spades, Trowels, Dibber Knives, Mincing Knives, Fish Turners, Butter Knives, Cake Turners, Cleavers, Hammers, Carpet Stretchers, Tack Claws, Marking Awls, Carpenters' Awls, Awl Points, Awl Cases, Ice Axes, Jacks, Nail Bits, Bush Hooks, Ice Axe Heads, Tongue Plates, Mouse Traps, Vegetable Slicers, Bit Braces, Butts and Spiral Springs, Fernines, Ham Tryer, Ham Stringers, Oyster Knives, Cold Chisels, Handles, Wood Handles, Putty Knives, Hairpins, Bone Pins, Bull Ring Needles, Bull Rings, Bill Hooks, Blind Adjusters, Curling Irons (Wrought), Cork Screws, Cattle Leaders, Corn Hooks, Dogg Sorlings, Knives (Kitchen), Scissors, Paper Knives, Pin Boxes (Aiken's Patent), Saw Sets (Improved Benzen), Spoons (Table and Tea), Washers (Tin and Iron), Knob Rings a specialty, and IMPLEMENT SCREW DRIVERS. Catalogues and Circulars sent on application.

WM. A. DODGE, Agent,
96 Chambers Street, N. Y.

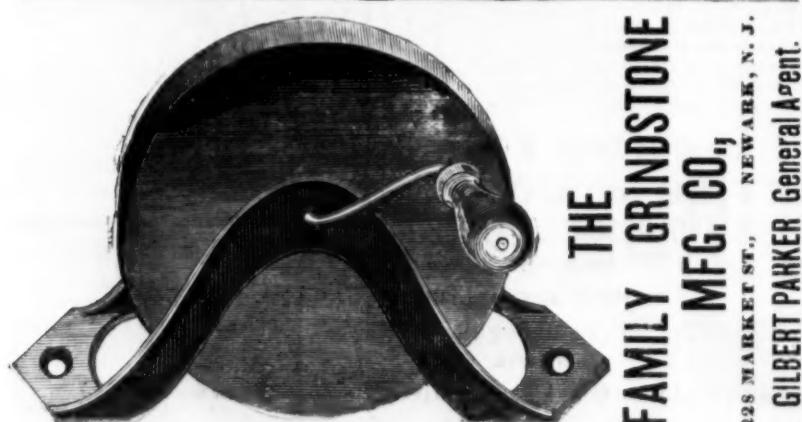
IRON BLOCK PLANE.

No. 110. 7 1/2 Inches Long, 1 3/4 Inch Cutter, \$9.00 per dozen.



STANLEY RULE AND LEVEL COMPANY, Manufacturers,
Factories, New Britain, Conn.

Warerooms, 35 Chambers St., N. Y.



**THE FAMILY GRINDSTONE
MFG. CO.,**
NEWARK, N. J.
GILBERT PARKER General Agent.
228 MARKET ST.,
Lowell Wrench Co., Worcester, Mass.

COBB & DREW,
Plymouth, Mass.

Manufacturers of Copper, Brass, and Iron Rivets; Common and Swedish Iron, Leather, Carpet, Lace and Glass Tacks; Flat Head, Headless, Tack, Clout and Cleat Box Nails, &c. Rivets made to Order.

NEW YORK AGENCY

**Grundy & Kenworthy
HARDWARE.**

165 Greenwich Street.

Agent for the Philadelphia Star Carriage and Tire Works.

Established in 1836.

Shelton Company,

Manufacturers of every variety of

TACKS & SMALL NAILS,

Carriage, Machine, Flour, Stove and

Tire Bolts, Coach Screws,

Bed Screws, &c.

BIRMINGHAM, ENGLAND

Established in 1839.

A. G. COES'

PAT. DEC. 26, 1871.

A. G. COES & CO.

WORCESTER,
Mass.,

Manufacturers of

THE GENUINE

COES'

SCREW WRENCHES.

Our goods have been very much improved recently, by making the Bar wide, as shown in the cut, which makes a 19 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

A. G. COES'

NEW PATENT

FERRULE

Which cannot be forced back into the handle.

Our goods are manufactured under Patents dated February 7, 1860, (No. 28,361), January 29, 1861, (No. 28,361), and Dec. 26, 1871, and any violation of either will be vigorously prosecuted.

We call particular attention to our new Patent Ferrule, with its Supporting Nut (shown in section in the above cut), which makes the strongest Ferrule fastening known.

A. G. COES & CO.



ECCENTRIC

BENCH HOOK

TUCKER & DORSEY

MANUFACTURERS,

INDIANAPOLIS, IND.



WHEEL

BRUSHES

OF ALL KINDS,

For Silversmiths and

all other Manufacturing purposes.

P. M. PREATER,

Manufacturer,

117 John St., N. Y.



Moore's Pat. Triple Acting

RATCHETS,

DRILLS & WRENCHES.

Good as the Best.

Cheap as the Cheapest.

Price \$5.00 to \$15.00.

Foster's Combination

BELT TOOL

IMPROVED HAND VISE,

Patented Aug. 10, 1875.

Send for lists and discounts to

H. S. Manning & Co.,

New York.

Winne & Campbell, Chicago.

Howard, Tallman & Co.,

Philadelphia.

Jackson & Tyler, Baltimore.

Chas. Churchill & Co.,

London, Eng.

Manufacturers' Agents, or to

The Hart, Bliven & Mead Mfg. Co.,

18 & 20 Cliff Street, and 243 & 245 Pearl Street, New York.

Factories at KENSINGTON, CONN.

MANUFACTURERS, IMPORTERS AND DEALERS IN

GENERAL HARDWARE.



AGENTS FOR THE

Patent Bessemer Metal Wood Screws.

MANUFACTURED BY

UNION STEEL SCREW CO.,
CLEVELAND, OHIO.

We are prepared to furnish these screws at manufacturers' prices, either Bright or Annealed, and will warrant them the strongest and most perfect Wood Screws in market.

In making orders, please state whether Annealed or Bright are wanted (we consider the former preferable); also, if it is desirable to have them shipped direct from Cleveland, Ohio. We deliver there or in New York free of freight.

**Lloyd, Supplee & Walton,
HARDWARE FACTORS.**

MANUFACTURERS OF

Bonney's Hollow

AUGERS.

Stearns' Hollow Augers

and Saw Vises

Bonney's Spoke Trimmers

Double Edge Sooke Shaves

Adjustable Gate Hinges

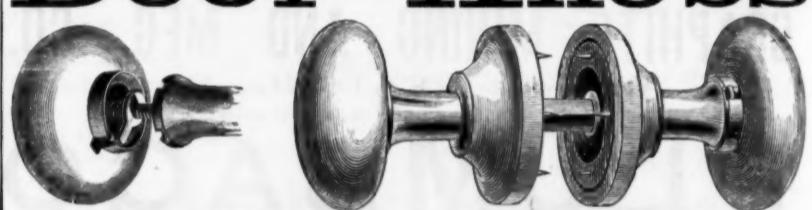
Scandinavian Pad Locks

Flat Key Brass and Iron Pad Locks, &c., &c.

625 Market St., Phila., Pa.



**WHIPPLE'S PATENT
Door Knobs**



THE WHIPPLE DOOR KNOB

Is the only perfect Door Knob Attachment ever invented.

AWARDED A BRONZE MEDAL

At the American Institute Fair, in New York, for 1874.

NO SCREWS USED IN NECK OR ROSES.

Adjusts Perfectly to Doors of Different Thicknesses

WITHOUT THE USE OF RINGS.

The attention of Architects, Builders and Carpenters is specially desired. Circumstances fully describing the advantages of this Knob, with Price List, sent on application to

The Parker & Whipple Co.,

WEST MERIDEN, CONN.,

Or 97 CHAMBERS STREET, NEW YORK.

WILSON MANUFACTURING COMPANY.,

NEW LONDON, CONN.

MANUFACTURERS OF

SOLID BOX VISES.

With or without Convex and Concave Washers.

Jackscrews, Braces, Coffe Mills, Turning Lathes; Clamp Heads and Screws; Parallel Bench Vises, Sash Pulleys, Hoist Pulleys, Composition Cocks, Bench Screws, Vise Screws, Gridirons, Drill Stocks and Bows, Box Chisels, Rivets, Sheaves, Block Pins, Composition Roller and Iron Bushings, Riggers' Screws, Caulkers' Tools, Pump Chambers, Belaying Pins, Martin Spikes, Malleable Iron Castings, and General Hardware.

GALVANIZING DONE TO ORDER.

WILSON MFG. COMPANY,

Warehouse, 97 Chambers and 81 Reade Streets, N. Y.



THE GARLAND.

The Prince of all Base Burners.

Four Sizes, Nos. 25, 30, 40 and 50.

Two Sizes with Ovens, Nos. 30 and 40.

THE CENTENNIAL YEAR
ITS FIRST APPEARANCE.

All New Patterns made at our own Works.

It has many **Essential Features** entirely different from anything in the **Market**. Its general appearance is very attractive; its beauty of ornamentation is unequalled; its working-qualities perfect; beside, its smoothness of castings, perfect fittings, burnished edges, full nickel-plated trimmings places it at the head of them all.

All doors swing out on a hinge, can be easily taken off to facilitate in blacking and cleaning the micas, and are provided with a portable, nickel-plated Turnbuckle, a new feature originating with us, as well, also, as the Urn Ornamental Top, which we claim Letters Patent on. Nickel-plated Plate ornaments the base of the Stove. Handle to dampers, number plate and even the heads of the rivets are all nickel-plated. The trade should not delay sending for a sample stove to insure their taking the lead in their respective localities.

WE ALSO MANUFACTURE A FULL LINE OF
Cooking, Parlor and Heating Stoves,

unparalleled by any in the market, as we use nothing but the best of Lake Superior Charcoal and other **First Class Brands of Iron**.

Send for Catalogue and Price Lists.

N. B.—To the Eastern Dealer we can arrange freight charges satisfactorily.

MICHIGAN STOVE CO.,
Detroit, Mich.



Patented July 28, 1874.

Guaranteed to clean better, last longer and work easier than any in the market. Removes all Carbon and Scale on the Boiler Tubes. Adopted and in use by United States Navy. For sale by dealers.

THE CHALMERS SPENCE CO., Foot East 9th St., N. Y., Agents for the United States.

HAMMER & CO.,
Branford, Conn.,
Manufacturers of the following Patented Articles of

MALLEABLE IRON:

Hammer's Adjustable Clamps.

Hammer's Malleable Iron Oilers.

Hammer's Mall. Iron Hand Lamps.

Hammer's M. I. Hanging Lamps.

For sale by all the principal Hardware Dealers.

Malleable Iron Castings

Of superior Quality and Hardware Specialties in Malleable Iron made to order.



THE "DUCKHAM" PATENT
Suspended Self-Indicating
WEIGHING MACHINE.
Capacities from 1 to 100 tons.

This machine is used on a crane or any lifting apparatus, and is accurate, requires no adjusting, portable, and the greatest labor saving weight ever introduced. Send for Circular and Price List.

ROBERT KING,
MANUFACTURER,
Hydraulic Presses, Accumulators, &c.
246 to 250 Plymouth St., Brooklyn, N. Y.

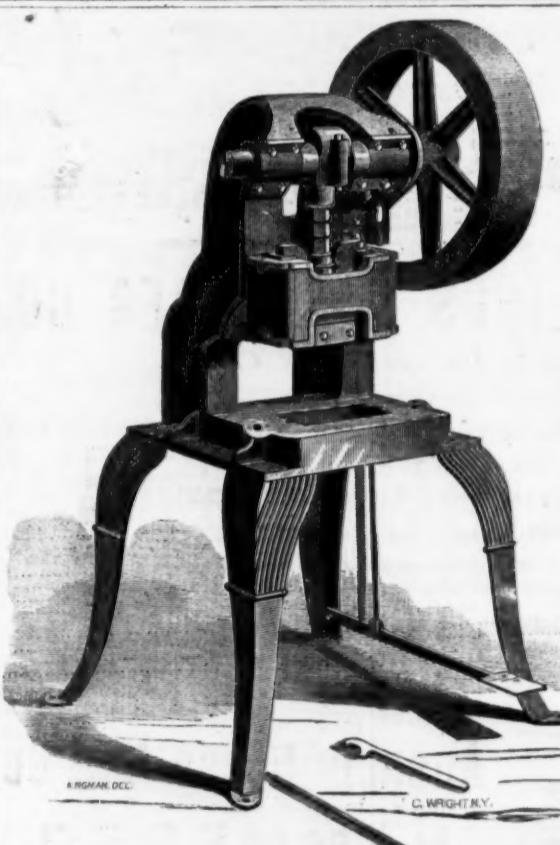
JOHNSON'S PATENT UNIVERSAL
LATHE CHUCK.

We invite attention to the superior construction of this chuck. Its working parts are absolutely protected from dirt and chips. It is strong, compact and durable, and will hold the greatest variety of work, as the jaws are adjustable with a range the full diameter of the chuck. For Price List address:
Lambertville Iron Works, Lambertville, N. J.

RIEHL BROTHERS,
Office and Works, N. 9th St., above Master, Phila.
Warehouses, 50 & 51 S. 4th St., above Chestnut, Phila.
New York Store, 90 Liberty Street.
Pittsburgh Store, 45 Smithfield Street.

SCALES
SCALE AND TESTING WORKS
ESTABLISHED 1858
PHILA'D'A

"Patented" Furnace Charging Scale,
Double Beam R. R. Track Scale, Compound Parallel Crane Beams, &c. Patented First Power Lever Wagon Scales. Testing Machines any capacity. Send for Illustrated Price List.



TEAL'S IMPROVED POWER PUNCH.
U. S. PATENT OFFICE, DEC., 1875.

The above represents our new pattern of Single Punch. The "head" is worked by a lever with jaws in the back end, which carry a Cam-gear with "treads," one on each side of the teeth; underneath the Cam is a Pinion, with treads corresponding to those on the Cam; as the Pinion revolves, the Cam rolls round upon it, the shape of the Cam being such that when the Pinion turns over, the treads are employed in raising the lever and the remaining one-fifth in dropping it, giving the head a slow downward and a quick upward motion. The action of the Pinion is like rolling friction, except that of the pin on which it revolves; the motion of the pin is like rolling up an inclined plane. The base of the lever on which the punch-head are provided with an arrangement for taking up the wear or lost motion, which avoids the necessity of repairing. The die-set is composed of two pieces, one to receive the punch, and for boiler makers the machine is made small at the end on which the die-set rests, for punching flanged heads, angles from 4d. to 10d. and 16d. to 30d. according to the thickness of iron.

These machines are provided with a loose and heavy fast pulley, and are made separate for punching sheet metal, sheeting, riveting, &c. and for the die-set, one machine can be furnished with attachments for all three purposes. Our regular patterns for Boiler Makers will punch 1 in. hole in 1 in. iron, shear 1 in. plate and cut off 1/8 in. bar iron, and will punch and shear in the center of 4d. and 6d. plate. Machines made to order for any kind of work, from the lightest to the heaviest.

C. A. & W. L. TEAL, 4116 Ludlow St., Philadelphia, Pa.
(Removed from 3029 Chestnut St.)
P. O. Address, Sinton B., Philadelphia.
CENTENNIAL SPACE, NO. 5037, SECTION C. 3, MACHINERY HALL.

THE VICTOR PLANES,
PRESSES, DIES, & SPECIAL MACHINES,
FOR WORKING SHEET METALS, &c.

167 to 173 Plymouth Street, Cor. of Jay, Brooklyn, N. Y.

OLIVER'S CHILLED PLOWS.



These implements, though but four years before the public in their present form, show the following remarkable record:
1506 were sold in the season of 1871. 7472 were sold in the season of 1873. 31,077 were sold in the season of 1875.
3049 " " 1872. 14,976 " " 1874. 42,130 having been sold the past spring.

The sales for 1876 will undoubtedly exceed 60,000 Plows. For full descriptive circulars, address,

SOUTH BEND IRON WORKS, South Bend, Ind.

IMPROVED DERINGER REVOLVERS.

No. 1, 22 Calibre; No. 2, 32 Calibre, Long Cartridge.



Cut Represents No. 2, 32 Calibre, 5 Shot. Size reduced one-third.

Exact Model of S. & W. No. 1 and No. 1 1-2 Revolvers.

These Arms are Half Nickel Plated and are equal in style of finish to the best Arms in the country. Quality of workmanship and material first-class; warranted. Price less than any other Hinge Barrel Cartridge Revolver of same quality in the market.

SOLE AGENTS:

EOW. K. TRYON, Jr. & CO., Dealers in FIRE ARMS,

No. 19 North Sixth Street and 220 North Second Street, PHILADELPHIA, PA.

THE VICTOR PLANES
Are the most simple, compact and practical Adjustable Planes ever offered to the public. They are made under the personal supervision of Mr. L. BAILEY, the original inventor of L. BAILEY'S PATENT ADJUSTABLE IRON PLANES. All our Planes have our Trade Mark, Send for Catalogue, embracing Planes, Try Squares, Bevels, Rules, Levels, Hammers, Mitre Boxes, etc., etc.

THE BILLINGS & SPENCER CO.,
HARTFORD, CONN.

MANUFACTURERS OF

Die Plates and Dies, Genuine Packer Ratchet Drills, Clamp, Die and Common Lathe Dogs, Barwick Wrench and Pipe Tongs, the Billings Patent Sewing Machine Shuttles, Marlin Spikes, Calkers' Tools, Clinch Rings, Saw Sets, Screw Drivers, and all description of IRON AND STEEL.

Drop Forgings.

Send for a Circular.



Ausable Horse Nail Co.,
MANUFACTURERS OF
HAMMERED,
Hammer Pointed, Polished & Blued
ROCK NAILS,
FROM
BENZON IRON.

Orders promptly filled at lowest market rates.
ABRAHAM BUSSING, Secretary,
35 Chambers Street, New York.

GLOBE NAIL COMPANY,

MANUFACTURERS OF

Pointed, Polished & Finished Horse Shoe Nails.

Recommended by over 20,000 Horse Shoers.

All nails made from best NORWAY IRON, and warranted perfect and ready for driving. Orders filled promptly and at lowest rates by

GLOBE NAIL CO., Boston, Mass.

Solder. —F. S. & Co.'s make:	
Best Fine.	19c
No. 1.	17c
Common.	15c
Braziers or Solder Solder.	30 to 35c
Antimony.	22c
Babbit Metal. —F. S. & Co. s.	15
Sheet Iron.	14c
Smooth, Smooth Smooth Smooth	
Common Com. Charcoal Junta	
25 & 30. 3c 5c 6c 9c	
27. 4c 5c 7c 9c	
Galvanized Iron.	31 to 30%
No. 24. 12c No. 25. 15c	
21 to 24. 14c 18c	
25 & 26. 16c 18c	
Russia Iron.	15
Perfect.	16c
American Russia.	13c
Lend. —A.	11c
Pig.	7c
Wire-wire.	8c
Coppered	12c

Wrought Scrap Iron.	per ton, \$900
Steel.	per lb.
Eng. Tool, gold	15c
American Iron	14c
Brass or Solder Solder.	30 to 35c
Tin Plates. —per doz	gold
Babbitt Metal.	15c
Sheet Iron.	14c

Copper.	25%
Spring.	7c
Mach.	5c
Bosemer.	6c
Tin Plates. —per doz	gold
L. C. C. 10x14.	6c
Char. Roof. IC. 10x20. 7c	10c
COKE.	25%
Lend. —	7c
Pipe.	8c
Sheet.	6c
Zinc. —Sheet. per lb.	8c
Spelter. —per lb.	10c
Antimony. gold	16c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Apple Parers.—Conqueror.

Hudson's Iron.

Axes.—Wm. Mann's Red Warrior.

Marshall.

Handies.

Douglas Dibbles.

H. L. B. & Co. L. & Co.

Jones & Co.

Hunt.

Axes.—Henry & Co.'s Patent Lubri-

ated Half Round Swelled Taper Plain Ta-

per and Concord Axle.

Common Axes (Pat. Lubricating), 14c, iron and

unwaxed.

Pat. Lubricating), 14c, iron and

unwaxed.

Blades, 10c.

Half Round, 10c.

Plain, 10c.

Swelled Taper, 10c.

Concord, 10c.

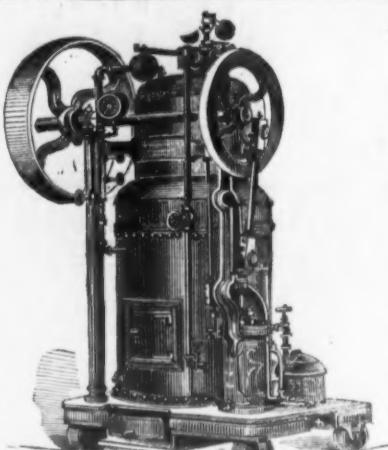
Swelled Taper, 10c.

Machinery, &c.

THE

Shapley Engine

Patented Feb. 10, 1874.

COMPACT,
PRACTICAL,
DURABLE,
ECONOMICAL.
\$200.00.Cheaper than any Engine offered of
the same capacity.MANUFACTURED BY
SHAPLEY & WELLS,
Binghamton Iron Works,
Binghamton, N. Y.Manufacturers of Steam Engines, Boilers, Water Wheels, Circular Saw Mills and
Mill Work generally.**BUSH HILL IRON WORKS,**

Corner 16th & Buttonwood Streets

PHILADELPHIA.

JAMES MOORE,

(Successor to MATTHEWS & MOORE,)

Engineer, Machinist, Founder and Boilermaker

CASTINGS of every description.

ROLLING MILL AND FURNACE EQUIPMENTS COMPLETE!

Rolls Turned for Rails, Beams, Angles, and all shapes for Iron, Steel, or
Composition Metals.

Sugar Mill, Saw Mill and Cist Mill Machinery,

AND MILLWRIGHTING IN GENERAL.

BOILERS—FLUE, TUBULAR AND CYLINDER, and all kinds of
TANK AND PLATE IRON WORK.

Chas. W. Ervien & Bro.
IRELAND ST.
Kensington PHILADA
BUILDERS OF
STATIONARY & MARINE
ENGINES, BOILERS
SHAFTING, GEARING,
AND
MILL WORK
GENERALLY.
Special Machinery
BUILT TO ORDER.

Vertical and Horizontal
Engines, of New and
Heavy Designs, from
2 to 100 H. P. on
hand, or in pro-
cess of erection.

CENTENNIAL SPACE:
Sec. B 9, Column 69, Machin-
ery Hall.

Visitors invited to in-
spect our improved method of
starting engines.

IRON AGE

Machinery, &c.

Established 1848.

WM. SELLERS & CO.,

1600 Hamilton Street, PHILADELPHIA.,

Engineers, Iron Founders and Machinists.**RAILWAY SHOP EQUIPMENTS.**Our Steam Hammers, Lathes, Planers, Drills and Bolt Cutters
Are of Improved and Patented Construction.Railway Turning and Transfer Tables,
SHAFTING & MILL GEARING, a specialty.**Pivot Bridges.****GIFFARD'S INJECTOR--IMPROVED, SELF-ADJUSTING.**

Issues Policies of Insurance after a careful Inspection of the Boilers

COVERING ALL LOSS OR DAMAGE TO

Boilers, Buildings and Machinery,

ARISING FROM

STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of STEAM BOILERS

Full information concerning the plan of the Company's operations can be obtained at the

COMPANY'S OFFICE, HARTFORD, CONN.,

or at any Agency.

J. M. ALLEN, Pres. W. B. FRANKLIN, Vice-Pres. J. B. PIERCE, Sec.

Board of Directors:

J. M. ALLEN, President.
LUCAS J. HENDERSON, Pres't Attna Fire Ins. Co.
FRANK W. CHENEY, Ass't Pres. Cheney Brothers
Silk Manufacturing Co.
CHARLES M. BEACH of Beach & Co.
JOHN P. BROWN of Brown & Evans Co.
GEO. M. BAIRTHOLEMEW, Pres't Amer. Nat'l Bank.
RICHARD W. H. JARVIS, Pres't Colt's Fire Arms
Manufacturing Co.
THOMAS O. ENDRIES, Secy Attna Life Ins. Co.
LEVERETT BRAINARD, of Case, Lockwood & Brainard.

GEORGE WM. B. FRANKLIN, Vice Pres't Colt's Pat. Fire
Ass'n, Pres't Attna Fire Ins. Co.
AUSTIN DUNHAM, Pres't Willimantic Linen Co.
GEO. CROMPTON, Crompton Loom Works, Worcester.
EARL M. MASON, Pres't Prov. & Wor. R. R., Prov.
WILLIAM ADAMSON, of Badger, Adamson & Co.,
Philadelphia.
WM. B. BEMENT, of Wm. B. Bement & Co., Phila.
HON. THOS. TALBOT, Ex-Governor of Mass.
C. W. FREELAND, Treas. Dwight Manufacturing Co.,
Boston.

**THE AMERICAN DREDGING CO.****BUILDERS OF STEAM DREDGING MACHINES,****GUNPOWDER PILE-DRIVERS, &c.**

CONTRACTORS FOR

IMPROVING RIVERS AND HARBORS,**EXCAVATING CANALS,****RECLAIMING AND FILLING LOW LANDS,****PILEING FOR FOUNDATIONS, PIERS, Etc.**

Offices, No. 10 South Delaware Ave., Philad'l'a.

Two First Premiums awarded by Franklin Institute Exhibition of 1874.

C. VAN HAACEN & CO., PHILADELPHIA, PA.
2341 and 2343 Callowhill Street,
Manufacturers of Latest Improved Machine Tools, Rotary Shapers, two sizes, Iron Planers, all sizes,
Horizontal Drill Attachments, for upright power drills, Self-feeding, Portable Drill's, hand or power, Expansion
Boring Bars, five sizes, Universal Slide Rest, for taper work, Twist Drill Sharpening Machines, automatic and adjustable in every direction, Noiseless Friction Gears, for transmitting up to thirty horse-power.
Send for Descriptive Circulars.

OVER 300 IN SUCCESSFUL OPERATION.
The "Dead Stroke"
Power Hammer
With Belden's Recent Improvements.

Guaranteed the best in Every Essential. Take Less Room,
Less Power, and costs Very much Less for Repairs than any other. See for descriptive circular with names of over 300 using
the (to whom we refer.)

THE HULL & BELDEN CO.,
DANBURY, CONN.
If we are advised as to the average work for which hammer is required, we will furnish the proper size and guarantee satisfaction
or no pay.

WE ALSO MANUFACTURE
Machinists' Tools & Special Machinery.
THE "CLIMAX" PIPE WRENCH,
(Latest and Best.)
THE "DANBURY" DRILL CHUCK,
(Recently improved and reduced in price.)
Hardware Specialties to Order. Models, Dies and
IRON & STEEL DROP FORGINGS.

KEYSTONE PRESSURE BLOWERS.
Anti-friction and noiseless; maximum blast and minimum power;
all sizes for
Forge, Foundries, Rolling Mills, &c.
ALSO
KEYSTONE EXHAUST BLOWERS.
Made on same principle,
For Ventilating Mines, Buildings, etc.; Removing Dust,
Shavings, etc.; Drying Wool, Lumber, etc. Every
Blower Guaranteed. Send for circular, or
call and see them in operation.

KEYSTONE PORTABLE FORGE CO.,
120 Exchange Place, Philadelphia.
Also, sole manufacturers of the celebrated KEYSTONE PORTA-
BLE FORGES, for all classes of work, from the lightest to the heaviest.

RICHARD DUDGEON,

No. 24 Columbia Street, New York,

MAKER AND PATENTEE OF

Hydraulic Jacks and Punches,**ROLLER TUBE EXPANDERS****And Direct-Acting Steam Hammers.**

Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order

Machinery, &c.

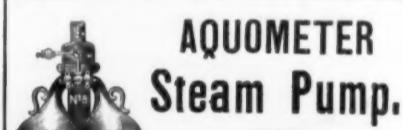
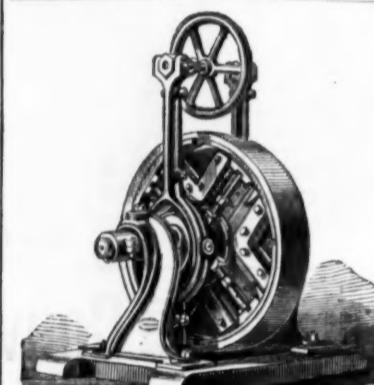
REPORT OF JUDGES

In Department F, Group 3, at the 44th
Exhibition of theAMERICAN INSTITUTE,
Held in the City of New York, Oct., 1875.No. 318, Drawing, Drop &
Punching Presses.THE STILES & PARKER PRESS CO.,
Of Middletown, Conn.

The machinery exhibited by these makers is of a character that calls for special commendation. In addition to their well known punching presses, to which every feature has been added in a press adjustable to an inclination for discharging work left above the die, there are exhibited by them a combined punch and shears, a drawing or blanking press, and a drop.

In all these there is shown the highest mechanical culture, applied to meet every practical requirement, to avoid every practical difficulty, and to enlarge the range of application of the machine, by devices which are at once elegant and effective.

Your committee would unhesitatingly recommend for this exhibition the "Medal of Progress," but find such award debarred by the rule of the Institute, forbidding such award unless a Silver Medal has been previously awarded. We, therefore, respectfully recommend the award of a Silver Medal.

Silver Medal Awarded.
A true copy from the Report on file.
JOHN W. CHAMBERS, Sec'y.**AQUOMETER**
Steam Pump.Highest Premium awarded by
Franklin Institute, 1874,
For Simplicity, Economy of
Construction & Efficiency.An absolutely Durable, Cheap, Efficient and Economic
Steam Pump. Requires no special care or
incubating. Warranted. Address for circular.
AQOMETER STEAM PUMP CO.,
10 South Dela. Avenue, Philadelphia,**EUREKA SAFETY POWER!**Practically impossible to
explode. Tested to 300 lbs.
pressure per square inch. Will
split a 3 inch seasoned oak—grind 8
hundred stones per hour. Price
\$250. Also Stationary Engines
and Boilers and Spark Arresting
Portable Engines for
plantation use. Send for our circular.
B. W. PAYNE & SONS,
Corning, N. Y.**VOLNEY W. MASON & CO.,**

Manufacturers of PATENT

Friction Pulleys,
Friction Clutches

For Connecting Shafting and Gearing,

ELEVATORS.

Lafayette Street, PROVIDENCE, R. I.

The Best Paper! Try It!!The **Scientific American** is the cheapest and
best illustrated weekly paper published. Every
number contains from 10 to 15 original engravings
of new machinery, novel inventions, Bridges, Engineering
works, &c., every new discovery in Chemistry. The
Scientific American has been published weekly for
30 years, and stands foremost of all industrial papers.
A year's numbers contain 832 pages and several hun-
dred engravings. Thousands of volumes are pre-
served for binding and reference. The practical re-
ceipts are well worth ten times the subscription
price. Terms, \$3.20 a year by mail, including
postage. Specimens sent free. May be had of all
News Dealers.**PATENTS** obtained on the best
terms. Models of new
inventions and sketches examined, and advice given.
All patents are published in the **Scientific American**,
the week they issue. Send for Pamphlet, 116 page
containing laws and full directions for obtaining
Patents.Address for the Paper or concerning Patents,
MANN & CO., 37 Park Row, New York,
Branch Office, cor. F and 7th Sts., Washington, D. C.

TUBAL SMELTING WORKS,
760 South Broad Street, PHILADELPHIA.
PAUL S. REEVES,
MANUFACTURER OF
ANTI-FRICTION METALS.

XXX Genuine.	.40c	C.	.90c
XX	.88c	D.	15c
X	.82c	E.	13c
	.30c	F.	11c
	.25c		

"Note."—The above are my standard mixtures, and have given satisfaction wherever used, but I am prepared to make Anti-Friction Metal of any quality or mixture desired by the purchaser.

BRASS CASTINGS, 21 to 90c. **INGOT BRASS,** 19 to 98c. **BRASS TURNINGS AND OLD METALS WANTED.**

ESTABLISHED 1842.

WM. & HARVEY ROWLAND,
PHILADELPHIA,P. O. Address:
Frankford, Philad'lpa.

MANUFACTURERS OF ALL KINDS OF

Elliptic, Platform & C Springs,

MADE EXCLUSIVELY FROM

SWEDISH STOCK, OIL-TEMPERED and WARRANTED.

Swedish Tire, Toe, Blister and Spring Steel.

CAST SPRING AND PLOW STEEL.
CAST SHOVEL, HOE AND MACHINERY STEEL.OXFORD TOE, SLEIGH, TIRE AND SPRING STEEL.
BESSEMER SHOVEL AND PLOW STEEL.
BESSEMER MACHINERY AND CULTIVATOR STEEL.RE-ROLLED NORWAY SHAPES.
NORWAY NAIL, RODS ROLLED AND SLIT FROM SUPERIOR BRANDS.**Iron Clad Can Co.,**

23 CLIFF STREET, N. Y.

THIS CUT REPRESENTS THE
IRON CLAD**FIRE SHOVEL**

Which every dealer should see before making his fall purchases. It combines beauty, strength and cheapness. It is stamped from one piece of metal (both blade and handle), the handle is round and attached to the blade in such a manner as to make it the strongest, as well as the cheapest shovel ever manufactured.

Manufacturers of STAMPED WARE, CAN TRIMMINGS, COAL HODS, ETC.

Send for Price List.



J. M. CARPENTER, Manufacturer of FIRST-CLASS TAPS and DIES, Pawtucket, R. I.

STAFFORD MANUFACTURING CO.'S
Stencil Combinations.

Containing: Stencil Alphabet, Figures, Can Stencil Ink and Brush.

Printing boxes, barrels, bags, and packages for shipment. Printing all kinds of advertisements, notices, signs, numbers, prices, &c., and other purposes too numerous to mention. Instructive and amusing for boys.

WHOLESALE PRICES.

Size. Size. Size.

24 in., per dozen. \$6.00 1 1/2 in., per dozen. .60

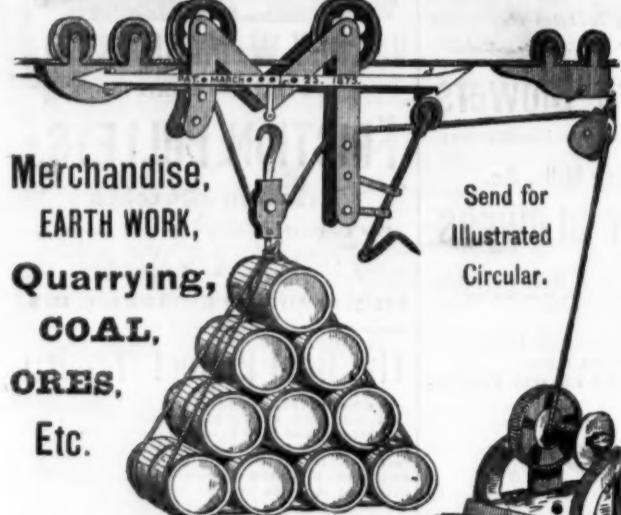
1 1/2 in., per dozen. 6.50 2 1/2 in., per dozen. .60

1 1/2 in., per dozen. 7.00 3 1/2 in., per dozen. .60

An illustration of sizes sent on application.

For sale by Hardware Dealers and Stationers.

No. 66 Fulton Street, New York.

Hoisting AND Conveying MachineMerchandise,
EARTH WORK,
Quarrying,
COAL,
ORES,
Etc.Send for
Illustrated
Circular.These Machines are
Automatic, combining
simplicity, generality
utility, and great fa-
cility in their working.Weighing apparatus
can be attached to the
machine and will weigh
without cost.Engineers' Office,
MANHATTAN GAS LIGHT CO., New York.
We use five machines most of the time, storing
200 tons in 10 hours with each machine and one
man, at a cost of three cents per ton. When using
three machines the cost is 1 1/2 cents per gross ton.BLACK LAMOND STEEL WORKS, Pittsburgh, Pa.
The Hoisting and Conveying Machine suits us;
we cannot say too much in its favor.For further information. Address,
U. S. HOISTING AND CONVEYING CO.,
115 BROADWAY, NEW YORK.**STANLEY G. FLAGG & CO.**
PHILADELPHIA, PA.
Office and Warehouse,
No. 216 & 218 N. THIRD ST.
Manufacturers of
STEEL CASTINGS.A Substitute for Steel and Wrought Ironings.
Circulars sent on application.**Steel Castings**

We make Steel Castings true to pattern, sound and strong. Can be worked same as bar steel. Plowshares, Mold-boards and Land-sides, Anthracite Coal-breaker Teeth, Wheels and Pinions, Dies and Hammer Heads, Engine and Machinery Castings of all descriptions. Railroad Frogs and Crossings. Invaluable for all articles requiring great strength and durability.

Send for Circular.

PITTSBURGH STEEL CASTING CO.,
PITTSBURGH, PA.**Crucible Steel Casting Co**
(LIMITED.)**Cast Steel Castings.**
Light and Heavy Castings made on short notice. Solid, ductile, true to pattern, can be readily forged and tempered.

Post Office Box 733.

PITTSBURGH, PA.



R. E. DIETZ,

54 & 56 Fulton St., N. Y.,

Manufacturer of

TUBULAR LANTERNS,
"Catch-em-Alive" Mouse Traps,
BRASS and IRON
JACK CHAINS.**SLIGO IRON MILLS**

Established 1825.

PHILLIPS, NIMICK & CO.

The only Manufacturers of

"Sligo" Fire Box Iron, Boiler Plate,
Sheet and Bar Iron,

AND PLATES ROLLED 100 INCHES WIDE.

OFFICE AND MILLS,

South Side, Pittsburgh, Pa.

Sligo Stay Bolt Iron, Warranted Unexcelled.

BOILER HEADS & FLUE HOLES
FLANGED TO ORDER.

Quality our Specialty.

UNIFORM SPEED
WARRANTED THE MOST
PERFECT GOVERNOR
IN THE WORLD.
However great or
violent may be
the change of load, never warrant any
possible uniform speed of engine desired.
ADDRESS, HUNTOON GOVERNOR CO., WRENTHAM MASS.**EXCELSIOR**
Do Your Own Printing!
\$3 per card, labels, envelopes, etc.
Business Men in the printing and advertising
game money and increasing their
profits greatly and make money fast at
the same time. Send for full catalog
of presses, type, etc., to the Manufacturers,
KELSEY & CO., Meriden, Conn.**TOLER'S PATENT**
Improved French Casters
The simplest in construction and most
reliable ever offered to the trade. Can be
put on in half the time, and more
permanently than the ordinary kind. Send for
Illustrated Catalogue.**JOHN TOLER, SON & CO.,**
Newark, N. J.
Small Gray Iron and Brass Castings.**SCRANTON**
Brass Works,
J. M. EVERHART,
Manufacturer of Brass Work for
Water, Gas and Steam. Brass
Castings and Jobbing promptly attended
SCRANTON, PA.

DU-PLAIN & CO.
TUBAL-CAIN METAL WORKS
MANUFACTURERS OF

ANTI-FRICTION METALS.

NOS 1303, 1305 Buttonwood St.
PHILADELPHIA.

Russell, Burdsall & Ward,
PORT CHESTER, N. Y.Manufacturers of
Carriage, Tire, Plow, Stove,
AND OTHER**BOLTS.**

Carriage Bolts made from Best Square Iron, a Specialty.

THE "GEM" SPRING

FOR

Screen Doors.

\$2.00

Per Dozen.



MADE OF

Cast Steel,

AND

Tempered after being Coiled.

Manufactured by

VAN WAGONER & WILLIAMS,

82 Beekman St., N. Y.

CARBON BRONZE & METAL REFINING WORKS.

B. W. BALDWIN, Manufacturer of

CARBON BRONZE

Castings for Cars, Mills and Machinery. Also supplied in Ingots to the trade. Guaranteed to be the safest and most durable Journal Metal made.

M. B. STOTLER, Gen'l Manager.

Office, near corner of 28th and R. R. Sts., Pittsburgh, Pa.

DERBY SILVER CO., Derby, Conn.,

Manufacture the most reliable

SILVER PLATED SPOONS & FORKS.

They are plated by weight, and not by time or guess, containing 20 per cent. more silver than the usual standard, on a base of Nickel Silver, and finished by hand. Each article is guaranteed by the trade mark and warranted to give full satisfaction. We ask of the trade a fair and impartial test, assuring them that the high standard already attained, shall be maintained. Send for Catalogue and Price.

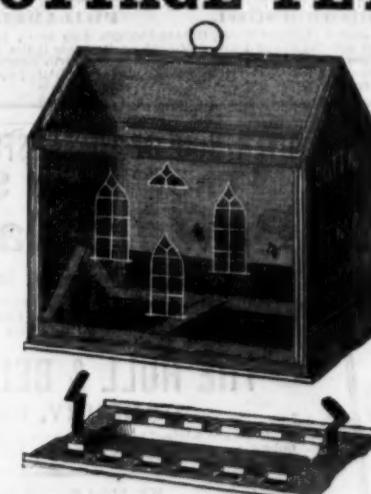
J. CLARK WILSON & CO.,

Manufacturers and Jobbers of Hardware,

81 Beekman Street, New York. P. O. Box 2355.

AGENTS FOR
THE COTTAGE FLY TRAP.

It has Won the Praise of Thousands.



Patented August 18, 1874.

The above cut shows the shape and design of the **COTTAGE FLY TRAP**. It is JAPANNED a dark red color, with bronzed border, the ends neatly lettered and ornamented. It HAS A NEAT AND ATTRACTIVE APPEARANCE, and does not look out of place in the dining room or parlor.The experience of last year warrants us in fully recommending it as **THE BEST FLY TRAP IN THE MARKET**.

IT SURPASSES ALL OTHERS IN CATCHING FLIES, its capacity for doing so being FOUR TO SIX TIMES GREATER than the so-called "Cone Traps."

It is compact, and its construction is so simple that a child can bait and manage it.

Its price is low as compared with all others. A trial will convince any one that it has no superior.

PUT UP IN BOXES OF ONE DOZEN EACH.

PRICE PER DOZEN, \$6.00.

Special prices made to large dealers. We solicit your orders.